

Flight, May 8, 1931

FLIGHT

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DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

- 1931
May 6-16. Glider and Sailplane Exhibition, Royal Agricultural Hall.
May 9. Flying Meeting, Bridgend, Glam.
May 9. Model Engineer Cup Competition, Sudbury.
May 14. "Metal-Clad Airship." Lecture, by C. Fritsche, before R.Ae.S.
May 14. "Petrol Engines for Models" Lecture by E. T. Westbury, before T.M.A.C., Junior Inst. Engineers, Victoria Street, S.W.1.
May 15. London Air Defence Club Dinner at Trocadero.
May 15-31. Stockholm Aero Show.
May 16. Reading Ae.C. Meeting.
May 23. Start of Whitsun Continental Cruise, Heston.
May 24. N.F.S. Air Pageant, Nottingham.
May 25. Scarborough Ae. C. Opening Meeting.
May 25-26. Northamptonshire Ae.C. Flying Meeting at Sywell.
May 28-June 13. Royal Tournament at Olympia.
May 30. Heston-Newcastle Air Race, for "Newcastle Evening World" Trophy.
May 31. N.F.S. Air Pageant, Sherburn-in-Elmet, Yorks.
June 2. R.A.F. Middle East Dinner at Connaught Rooms.
June 6. Brooklands Air Meeting.
June 6. Lincolnshire Ae. C. Meeting at Cleethorpes.
June 7. N.F.S. Air Pageant, Hull.
June 8. International Rally, Bucharest.
June 9. Air League "Speed" Ball at the Dorchester, Park Lane, W.
June 20. Flying Display and Air Pageant, Bristol Airport.
June 21. N.F.S. Air Pageant, Reading.
June 26. R.A.F. Dinner Club Annual Dinner.
June 27. Royal Air Force Display, Hendon.
July 10-19. Circuit of Italy.
July 22. Household Brigade Flying Club Meeting, Heston.
July 25. King's Cup Race.
July 25-Aug. 9. Rhön Gliding Competitions, Germany.
Sept. 5. Haldon Flying Meeting.
Sept. 12. Schneider Trophy Contest.

EDITORIAL COMMENT



IN a recent issue we prophesied that a result of recent rapid flights across the Empire would be that a section of the Press, being unable to distinguish between the needs of a passenger service by air and those of an air mail service, would take up a sarcastic attitude towards the passenger service of Imperial Airways across Africa. Our prophecy has been fulfilled. A shadow has been cast over the subject by the tragic death of Commander Glen Kidston, but the lessons of his fine effort remain a fit subject for discussion. We have received cuttings from the *Natal Mercury* and the *Natal Advertiser*, both dealing with the subject. The *Mercury* appears to us to take a very sensible view of the matter. It records some remarks of Mr. Sampson, the Union Minister of Posts and Telegraphs, to the effect that air mail development must go slowly (not meaning, we presume, that the machines must necessarily fly slowly) and find its own feet until the country's requirements are known. The paper proceeds: "There can no more be based on the achievement of the Lockheed Vega a comparison of what Imperial Airways machines can or ought to do than there can be between what Imperial Airways and the United States air mails are doing. Conditions are totally dissimilar. . . . Even in the transport of mails the time factor is not always the paramount concern."

The *Advertiser* has one cautious sentence: "We are not going to say that Imperial Airways can do more than up to now it has done. This is a matter for experts to decide." But the rest of a two-column article gives the impression that the paper is strongly convinced that Imperial Airways certainly ought to do considerably more. The text of the article is an amusing story, alleged to have been told by Lord Dunsany (we are unable at the moment to verify the reference), concerning a Veld fire which broke out shortly after the famous race between the hare and the tortoise. The wild animals of the Veld decided that a neighbouring fract must be warned, and consulted as to who should be the messenger. Logicians pointed out that the tortoise had recently defeated

the hare in a measured contest and had thus established its right to be the dependable messenger. So the tortoise was sent, and the rest was silence.

Of course, the moral is that Imperial Airways is the tortoise and the speedy fliers are the hare. The *Advertiser* then turns to a consideration of the breakdown of Imperial Airways' flying-boat service on the Khartum-M'wanza section of the route, and asks where is the reliability which Imperial Airways holds out as its chief asset in default of greater speed? Here the *Mercury* joins forces with the *Advertiser*. Both papers are agreed that Imperial Airways ought not to have broken down. The *Advertiser* concludes with the remark: "There may still be something to be said for the tortoise as against the hare when all goes well. But what about when the tortoise goes sick?"

That is certainly a telling point, but it suggests the further query, "What about when the hare breaks down?" A number of fast-flying pilots have got through, but how many of these pilots have failed to get through at all or in reasonable time? Stack and Chaplin, both very experienced pilots, have set out twice to break the record to Australia, and twice have had to come back. Scott's story of his dash to Australia showed that on more than one occasion he was within a mere ace of wrecking his machine and perhaps himself. Does real good luck in bringing off a blind landing on a flooded aerodrome on a dark night qualify the hare to claim greater reliability than the tortoise? "Stunt" flights really prove nothing so long as they owe anything to luck. Air transport must be based on good organisation. That, too, will sometimes break down, in the case of steamers and trains as well as aeroplanes. The risk which Imperial Airways took was in opening a new service when they were short of aircraft. It was not altogether their fault that they were short. Some of the machines which they had ordered were late in delivery. Had they decided to postpone the opening of the new service until their new fleet was ready, they would have laid themselves open to just as severe criticism as they have met by starting off and breaking down. There was no question of risk to life in making the attempt to run on an exiguous fleet, and so one cannot seriously blame them for having taken that amount of risk. The failure, and the consequent diatribes of the South African papers are the forfeit which had to be staked. Frankly, the loss of the forfeit arouses our sympathy; especially as it has been followed by a very mysterious loss of a "Hercules" in Timor and of an "Argosy" when a new pilot was going through his tests at Croydon.

To return to the fable of the hare and the tortoise. Confusion of thought has arisen, as we foresaw that it would arise, by not placing passenger services and air mails in separate categories. The successful (though sometimes lucky) rapid flights have had as their object the acceleration of air mails. Imperial Airways, under their present subsidy contract, are obliged to carry both mails and passengers. As the firm naturally desires to earn dividends, and as the taxpayers who provide the subsidy expect them to pay their way and to dispense with a subsidy as early as possible, one cannot seriously expect the company to embark on specially rapid mail services under their present contract. The pace of an army is the pace of its slowest unit. So it is with aircraft

cargoes. Passengers cannot be hurried across continents by day and night at the pace which would be reasonable for a special mail-plane.

The publication by the Air Ministry of specifications for a special mail-plane has, as we have remarked before, ushered in a new era. Doubtless a new contract with Imperial Airways will be necessary to provide for the trying-out of the new class of aeroplane when it makes its appearance. When that time comes, we shall expect to see the experience of Imperial Airways in organising air services brought into play so as to produce a really fast and reliable mail service. With relays of pilots and machines, the element of luck and the element of personal hardihood, on which some of the stunt pilots have had very largely to rely, should both be reduced to a minimum. We shall then expect the speed, not merely of the hare, but of the greyhound, the ostrich, the hunting leopard, to be combined with the reliability of the tortoise.



Mr. Wedgwood Benn, Secretary of State for India, in reply to a question in the House of Commons the other day, said that he was engaged in consultation with the Air Minister and the Government of India in working out details of a new Indian Air Force, and he hoped that it would be definitely instituted before long. He added that it would be distinct from the Indian Army. To this the Simla correspondent of *The Times* has added the information that a nucleus may be established by the autumn of 1933; that it will probably start with one flight and headquarters, which would gradually be increased to a full squadron; that at first the C.O. and one other officer will be British, but that the remaining officers will be Indians trained at Cranwell. The ground staff will be recruited from apprentices employed by the State railways.

As we have stated before, we shall regard this scheme with approval when it has proved itself a success. Unless the greatest judgment is exercised, there are many possibilities of the result being the reverse of a success. That a sufficient number of good Indian pilots can be found there is not the slightest doubt. The flying clubs of India have trained men who have shown themselves able to fly from India to England. Cranwell training will surely produce even better results. We remember, too, the fine exploits of at least three Indians who were officers of the R.F.C. during the war. It is of the Indian mechanics that we have our misgivings. In our opinion, European inspection will always be a necessity.

Presumably, it is inevitable that the Indian Air Force should be started as a separate Service, not as a part of the Indian Army. The wisdom of the policy is, perhaps, questionable. At present the defence of the Indian coast line is a function of the Royal Navy; that of the northern frontiers concerns the Army in India under the Commander-in-Chief. Until aircraft are developed to a pitch which has not yet been reached, the Air Force can hardly relieve the Army of that responsibility. Therefore it would seem wiser for the time being to place all flying units under the Commander-in-Chief. This is less easy if they belong to a separate Service.

THE METAL "MARTLET"

Southern Aircraft, Ltd. have just produced a metal version of the "Martlet." Although a light 'plane and fitted with a Hermes II engine of 105 h.p. only, the metal "Martlet" has an excellent performance and should be very useful for fighter training, advanced aerobatics, sporting flying, &c.

WORKING quietly and saying little about it, Mr. Miles, of Southern Aircraft, Ltd., Shoreham, and Mr. Basil B. Henderson have been putting their heads together for some months, and have now produced a metal version of the well-known "Martlet" biplane which Mr. Miles first brought out some years ago. The original "Martlet" was something of an eye-opener in the way of performance, speed-range and manoeuvrability, and in the metal version these qualities have not only been retained, but have, in some cases, even been improved. The result is a machine which, although of low first cost and easy maintenance, gives a performance which is little short of marvellous. The metal "Martlet" has been designed for, and should be extremely useful as, a type for the training of pilots in air fighting, as the performance and manoeuvrability are such as to simulate very well the characteristics of a high-power single-seater fighter. The sturdy construction and great manoeuvrability should also make the machine very useful for training pilots at low cost in advanced aerobatics, while the sportsman who wants something "snappy" and fast, while at the same time docile when it comes to landing, should find much to appeal to him in the metal "Martlet."

Designed jointly by Mr. Basil Henderson and Mr. Miles, and built at the Shoreham works of Southern Aircraft, Ltd., the metal "Martlet" is a single-seater biplane of mixed construction, the producers having used metal only where it could be readily and cheaply substituted for

wood, while retaining wooden components which would be more

difficult and expensive to produce in metal.

For instance, the fuselage is a steel tube structure, the tubes being of square section, and struts and longerons being joined together by steel flitch plates riveted or bolted on. The structure has been designed to be rigid without the use of bracing wires, and there is no rigging or adjustment to be made by the user. Should a fuselage tube become damaged, it can be replaced without disturbing the rest of the structure. The main fuselage structure is enclosed in wooden fairings with doped linen covering.

The biplane wings are mainly of wood construction, with wooden spars and wing ribs, and braced by high-tensile steel wire and streamline steel tube struts. The wings are designed to fold, and as the machine is of small dimensions, the space occupied when the wings are folded is very small indeed.

An undercarriage of the divided type is fitted, constructed of steel tubes throughout. The wheels are carried on steel forgings, and are mounted on roller bearings. Low-pressure tyres are fitted, and, as the telescopic legs of the undercarriage (of the oleo-steel spring buffer type) have a long stroke, the landing shocks are very effectively damped, while the tendency to bounce has been reduced to a minimum. The wheels are fitted with independently-operated brakes, so that not only can the machine be stopped in a very short distance, but manoeuvring on the ground is greatly assisted. A steel spring tail skid is fitted.

Very particular attention has been paid to the controls, which are effective at all speeds within the speed range, and friction in bearings has been reduced by fitting ball bearings at all important points.

Although the machine is of the vertical biplane type (to facilitate folding), the view from the cockpit is quite exceptionally good, a fact of considerable importance in a machine intended for fighter training and advanced aerobatics.

It is not desired to give very detailed data concerning the metal "Martlet" at present, but it may be stated that the disposable load is 375 lb. The top speed is about 130 m.p.h., while the landing speed is only about 40 m.p.h. The machine cruises at 115-120 m.p.h., and the cruising range in still air is 400 miles. The rate of climb at ground level is spectacular, being of the order of 1,400 ft./min. In a flat calm the machine takes off in 60 yards, and the landing run, also in no wind, is only 70 yards. The service ceiling is about 20,000 ft.

The engine fitted is a 105-h.p. Hermes II, neatly cowled in.



SIDE VIEW OF THE METAL "MARTLET": In spite of the fact that the machine is a vertical biplane, the view is very good. The upper photograph shows the machine doing a "zoom."



The Schneider Contest

GENERAL ITALO BALBO, the Italian Air Minister, created a sensation by a speech in the Chamber on April 29, when he is reported to have said that it was not certain that Italy would take part in the Schneider contest. They had the pilots, but he understood the difficulties and discouragement which manufacturers must face in solving the Schneider Trophy problem, in producing machines, and, above all, engines, which were capable of ensuring victory. He added that this contest called for the development of a sporting sense strong enough to face a possible failure without taking the consequences too tragically. He knew that France at least would challenge, but Italy would not take

part unless she had some hope of a good place. He hoped that this would be the case, in which case Italy would not fail to be present. Italy has deposited the stipulated amount of 200,000 francs for each of the three seaplanes which she has entered. If no Italian machines face the starter on September 12, the rules provide that this deposit will be forfeited. We sincerely hope that this will not take place. We should like to welcome our friendly rivals, the Italian Royal Air Force, over here again, for we know that they have developed a sporting sense strong enough to face failure without taking it too tragically. They are good sportsmen, and we hope for another contest with them—with better luck than they experienced last time.



READY TO START: Some of the Morane Saulnier Moths (85 h.p. Gipsy) line up for the start of the Tour of France at Orly.

THE TOUR OF FRANCE

The constantly increasing interest in Aerial Touring that is being taken in France was well manifested on April 25 when, notwithstanding the early hour and inclement weather, 43 'planes were assembled at the Orly (Paris suburb) Airport awaiting the starting signal for the "Tour of France." This contest was national in character and the entries were limited to owners of French nationality and to 'planes registered in France.

WE give below some particulars we have received from our French Correspondent regarding the Tour of France Competition, which started from Orly on April 25. This competition extends over 16 days, concluding at Orly on Sunday, May 10. The following notes are confined to the nature of the tour, the competitors and their machines, and the start. Next week we hope to publish a report of the contest itself, with, possibly, the results.

According to the regulations all planes were to be on the starting line at 7 a.m., and at that hour a large crowd had gathered at the airport. All classes of pilots were represented; many owners were flying their own planes, and such well-known veterans as Marcel Lallouette and George Reginensi, who recently made the new weight-carrying speed records in the Farman 302 plane, as recently described in *FLIGHT*. René Labouchere, the chief pilot of the Potez Co., Paul Mauler, the air line pilot, and the long-distance flight airwomen Maryse Hilz and Maryse Bastie, were also among those taking part.

M. Etienne Riche, the Assistant Air Minister, was among the prominent personages present, and made a short speech to the pilots before the "take off." The Minister, after wishing them "bon voyage," pointed out that the "Tour of France" was an occasion to develop propaganda for tourist aviation, and that it was not to be considered as a speed contest.

The start was delayed a short time owing to the bad weather, but at 8 o'clock Lallouette, flying a Farman 231 took off, and was followed in rapid succession by one plane after the other. The weather was decidedly unpropitious, and the high wind and rain squalls shook up the light planes severely. Forty-two of them, however, "took off" successfully, and quickly disappeared over the horizon.

The competing machines included all the French light plane makes, and were equipped with motors ranging from 40-H.P. Salmsons to 230-H.P. "Titans" and Salmsons. The 42 machines comprised the following:—

Potez, 12, all type 36 cabin monoplanes, nine with 95-h.p. Renault, and three with 95-h.p. Salmson engines.

Caudron, 11, made up of six type 232 (95-h.p. Renault), three type 230 (95-h.p. Salmson), one type 193 and one type 128 (120-h.p. Salmson).

Farman, 8, comprising two each of type 190 cabin monoplane (230-h.p. Titan), 204 (110-h.p. Lorraine and 95-h.p. Salmson), 231 (95-h.p. Renault), and one each of 230 (40-h.p. Salmson), and 232 (100-h.p. Michel).

Morane Saulnier, 6, of which five were Moths (85-h.p. Gipsy) and one M.S. with 120-h.p. Salmson.

The remaining machines consisted of one each of the following:—

Moth D.H. 60 (85-h.p. Gipsy), **Lorraine Hanriot** 10 monoplane (110-h.p. Lorraine), entered by Soc. Générale Aéronautique; **Mauboussin** cabin monoplane (40-h.p. Salmson); **Schreck** Amphibian 290 biplane; **Guerchais** monoplane (95-h.p. Renault).

The full list of entries is given in the accompanying table.

This "Tour of France" is being held under the auspices of "The Union des Pilotes Civils de France," of which Marcel Haeglen, the well-known war ace, is the President, aided by the Paris daily, "The Journal," and a number of other newspapers throughout France. It has been especially designed to aid aeronautical propaganda and to create an active interest in tourist aviation (aviation de tourisme). It is not intended to cater to sport planes or to pilots who do acrobatic stunts. The managers of the



TWO TYPES IN THE TOUR OF FRANCE: Top, the Farman 190 (230 h.p. Titan), of which two were entered. Below, the Schreck Amphibian 290 biplane flying boat (180 h.p. Hispano).

Competitors in the Tour of France

Machine	Engine and H.P.	Pilot	No. of Passengers	Machine	Engine and H.P.	Pilot	No. of Passengers
Farman 231 ..	95 Renault ..	André Herbelin ..	1	Caudron 232 ..	95 Renault ..	Pierre Pharabod ..	1
Farman 230 ..	40 Salmson ..	Reginensi ..	1	Potez 36 ..	95 Renault ..	V. Martinoff ..	1
Farman 231 ..	95 Renault ..	Lallouette ..	1	Caudron 232 ..	95 Renault ..	Marc. Legendre ..	1
Farman 232 ..	100 Michel ..	Marcel Coadou ..	1	Caudron 232 ..	95 Renault ..	René Roulin ..	1
Farman 204 ..	110 Lorraine ..	Jean Moreau ..	1	Caudron 193 ..	—	Jean Arcaute ..	1
Farman 190 ..	230 Titan ..	Maurens ..	3	Caudron 232 ..	95 Renault ..	Guilbert ..	1
Farman 190 ..	230 Titan ..	Marcel Avignon ..	4	Caudron 128 ..	120 Salmson ..	Mauler ..	1
Moth D.H. 60 ..	85 Gipsy ..	Le Folcavez ..	1	Potez 36 ..	95 Renault ..	Lhuillery ..	2
Moth-Morane ..	85 Gipsy ..	Maryse Hilsz ..	1	Potez 36 ..	95 Salmson ..	Jean Lietard ..	—
Moth-Morane ..	85 Gipsy ..	De Bimard ..	1	Caudron 230 ..	95 Salmson ..	Burlaton ..	1
Moth-Morane ..	85 Gipsy ..	Paul Chemidlin ..	1	Potez 36 ..	95 Renault ..	Yves Ripault ..	1
Potez 36 ..	95 Renault ..	Jean Durandea ..	1	Potez 36 ..	95 Salmson ..	Abrial ..	1
Moth-Morane ..	85 Gipsy ..	Lebeau ..	1	Caudron 230 ..	95 Salmson ..	André Max ..	1
Guerchais ..	95 Renault ..	Henry Massot ..	2	Potez 36 ..	95 Renault ..	Band ..	1
Moth-Morane ..	85 Gipsy ..	F. Mailinvaud ..	1	Potez 36 ..	95 Renault ..	Robert Blanger ..	1
Mauboussin ..	40 Salmson ..	Vécruysse ..	—	Potez 36 ..	95 Renault ..	Laporte ..	1
Morane-Saulnier ..	120 Salmson ..	Gab. Grillot ..	1	Potez 36 ..	95 Renault ..	Joly ..	1
Caudron 230 ..	95 Renault ..	Mauryse Bastie ..	1	Potez 36 ..	95 Salmson ..	Pierre Colin ..	1
Caudron 232 ..	95 Renault ..	Paul Perrier ..	1	Potez 36 ..	95 Salmson ..	Labouetiere ..	1
Caudron 232 ..	95 Renault ..	Andre Vaillant ..	1	Farman 204 ..	95 Salmson ..	Porodhomme ..	1
L.H. 10 ..	110 Lorraine ..	Guertiau ..	1	Schreck ..	180 Hispano ..	Lousi Duc ..	—

"Tour of France" want to show that tourist planes are comfortable and safe means of transportation, and can be depended upon to arrive on regular prearranged schedules.

This "Tour" of aeroplanes is being accompanied by a tour of motor cycles and automobiles under the auspices of the Motor-Cycle Club of France and the "Journal." The land vehicles met the planes at Nantes on the completion of the first section and are continuing on with them around the itinerary as arranged, taking part in the exhibitions arranged for each city.

The "Tour" has been divided into nine sections of comparatively easy stages each. It is 3,000 kilometres (1,864 miles) in length, and will take the participants all around France, lasting some 17 days. Each section, except one, will be flown every other day, and is calculated to take about 4½ to 5 hours to do so. The intervening time will be devoted to exhibitions at the various stopping places in order to show the planes and create an interest in tourist aviation. It is desired that each section shall constitute a test of regularity, and planes that make the flight between these cities in less than 5 hours will receive a "regularity prize" consisting of 400 francs per plane and 100 francs per passenger (pilot excepted). This prize will be doubled on the last section, Douai-Orly.

The itinerary as laid out is as follows; the cities shown in brackets being optional stops, but landings must be made at the others:—

First Section: April 25.—Paris-Orly (Chartres), le Mans (Anger), Nantes. April 26, Exhibition at Nantes.

Second Section: April 27.—Nantes (Lucon), Rochefort (Jonzac), Bordeaux. April 28, Exhibition at Bordeaux.

Third Section: April 29.—Bordeaux (Cazaux), Biarritz (Paul), Toulouse. April 30, Exhibition at Toulouse.

Fourth Section: May 1.—Toulouse (Carcassonne), Perpignan (Montpellier) Nîmes. May 2, Exhibition at Nîmes.

Fifth Section: May 3.—Nîmes (Avignon), Marignanne (Cuers-Pierrefeu), Saint Raphael.

Sixth Section: May 4.—Saint Raphael (Orange), Montelimar (Saint-Rambert d'Albon), Lyons. May 5, Exhibition at Lyons.

Seventh Section: May 6.—Lyons (Macon), Pontarlier (Mulhouse-Colmar), Strasbourg. May 7, Exhibition at Strasbourg.

Eighth Section: May 8.—Strasbourg (Nancy), Reims (Valenciennes), Douai. May 9, Exhibition at Douai.

Ninth Section: May 10.—Douai—Orly (Paris).

The last section, Douai—Orly airport, will consist of a speed contest—the only one in the tour, and should prove very interesting. The classification formula will be $\frac{V}{P}$ representing

the speed of the plane, P representing H.P. per passenger.

A "Take off" and Landing Competition will also be held on the arrival of the planes at Buc. For the "Take off" the plane will be required to pass over an outstretched cord held at a height of one metre in as short a space as possible.

For the "Landing" Competition the pilot will be required to land after passing over the outstretched cord held at one metre in height in as short a space as possible. Three trials in each case will be allowed.

The classification formula will be as follows:—

$$(LD + LA) \sqrt{P}$$

LD being the length of "take off"; LA being the length of "landing"; P, H.P. per passenger.

Cash prizes of 20,000 francs will be awarded in the Speed Contest and 30,000 francs in the "Take off" and "Landing" Competitions. A number of valuable art objects will also be distributed as additional prizes. R. C. W.



THE TOUR OF FRANCE: Sketch map of the circuit. The nine sections are shown in alternate full and dotted lines, while compulsory stops are indicated by full capital letters.



TWO MORE TYPES: Left, one of the twelve Potez 36 cabin monoplanes (95 h.p. Renault or Salmson) entered. Right, the Morane Saulnier Moth (85 h.p. Gipsy), of which there were five.

AIRPORT NEWS

BRISTOL

BRISTOL Airport was the scene of much animation on Saturday afternoon, May 2. By midday several visiting aircraft had arrived, including Mr. B. S. Allen on a standard Avian (Hermes II) and Miss Winifred Brown in her new Sports Avian "Jerry" (Hermes II). Mr. Allen, who is Aviation Manager for Henlys, had, in conjunction with the authorities at Bristol, arranged an Avian demonstration for the afternoon, and, besides those already mentioned, Mr. H. C. D. Hayter came in one of the very latest Sports Avians with Gipsy II engine and Dunlop semi-balloon tyres, which he had been lent for the week-end, and later on Mr. V. Holman, the Sales Manager of the Cirrus Hermes Engineering Co., arrived in his demonstration Avian (Hermes II). Finally, last, but by no means least, Mr. Keith Jopp appeared in his old Mark II Avian (Cirrus III).

Quite a large crowd was present on the aerodrome, and they all took a very great interest in these machines. The brilliant red new machine which Mr. Hayter had flown down was in great demand, and must have been tried by very nearly every one present who could fly.

Earlier in the day it had been expected that Capt. Frank Hawks would have come over from Filton, where he was paying a visit to the Bristol Aircraft Works. Actually, he arrived some two hours late, and apologised for this with an explanation that during the morning he had run short of money and had to go over to Paris to get some. His flying time from London to Bristol was 28 min.! After having looked round the clubhouse and discussed his machine with Capt. Winters, the Manager of the Airport, and many others, he left for Castle Bromwich about 3 p.m. Being able to travel with such speed as he does must make Capt. Hawks' life very full, for, having done his duty at Castle Bromwich and taken tea there, he was back in Hanworth again soon after 5 p.m., giving an exhibition of towed gliding. We understand that he has now left for France for a few weeks, but will be paying us a visit again later on.

Among those who ably assisted Mr. Allen in entertaining those interested in the Avian, was Mr. George Smith,

the very popular and genial local Manager of Henlys, Ltd., in Bristol. He was indefatigable in transporting those who were staying the night, into Bristol, and also in seeing to their wants later on in the evening.

Two other machines of interest were also on view during the afternoon, the first being the Redwing, for which Merlyn Motors are the local agents, and it was brought down by Flt.-Lt. Russell, the Redwing Aircraft Co.'s Sales Manager. This machine has an exceptionally low landing speed, and many interested people were taken for trial flights, to emphasise the advantage of its side-by-side seating. Merlyn Motors also, of course, deal in other aircraft, and amongst their recent sales is a Klemm (Salmson) which they sold to Lord Apsley, who is an experienced pilot, and will be using the machine from his country place, near Bristol. The other machine was the Civilian Coupé, for which Henlys have secured the sole agency, and not, as we inadvertently stated last week, Merlyn Motors. Mr. Dawson brought this interesting machine down, and worked harder than anyone else taking up passengers. He told us he had put in five hours' flying at the aerodrome by the time he finished for the evening. We described the Coupé very fully in FLIGHT for April 10, and there is no doubt that the idea of being able to obtain the comfort of enclosed side-by-side seating with an excellent all-round performance and an exceptionally good view for under £800, which incidentally includes a machine built like rock and fitted with wheel brakes, will attract a very great deal of attention as soon as it is better known.

Arrangements for the summer meeting at the Airport, which is to take place on Saturday, June 20, are well under way, and the occasion will include a visit of Capt. Barnard's Circus to the Airport. The club has been entrusted with running the race for the S.B.A.C. Challenge Trophy on the same day, and this will start from Heston at about 1.30 p.m., finishing at Bristol at about 2.45 p.m. Unless an exceptionally large entry is received, the visitors will not be expected to arrive at Heston before 10 a.m. on the morning of the race for checking over by the handicappers.



Capt. Frank Hawks at Bristol; on his right is Mr. Downes-Shaw, the Chairman of the Bristol and Wessex Club, while on the extreme right of the photograph is Mr. Norman Edgar, who runs Merlyn Motors depot at the Aerodrome, with Capt. Winters, the manager of the Airport, next to him.

CROYDON

WE have to endeavour actually to cover the last fortnight in this week's notes. Owing to a last-minute hitch, the usual weekly notes did not appear in last week's issue. The main item of interest for the week ending April 25 was the loss of one of Imperial Airways' Argosies on the 22nd. The machine was being flown by Mr. Mail, one of Imperial Airways' South African pilots, who was undergoing the usual test of three light and three heavy landings before having his licence endorsed as being efficient on this type. He had successfully completed five of his landings, and was taking off again for his final landing, when his left engine cut out completely. He endeavoured to get off on the remaining two, but the machine swung to the right, crashed through the iron fencing separating the aerodrome from the aircraft factory, and settled itself on top of an old aircraft dump in the factory grounds. The pilot managed to get clear just as the tanks exploded and fired, burning out the machine completely. One of the Marconi engineers, who was a few yards from the spot, rushed forward, not know-

ing the pilot had got clear, and is now minus his eyebrows. However, he made a stout effort regardless of personal injury, and we congratulate him for it. The machine crashed on a spot where no clearing up was necessary, and away from the public view. Many opinions have been expressed regarding this accident, but one refrains from any comment here, and treats it only for its worth as an item of news. We feel deeply sorry for Douglas Mail, for he is a very good fellow.

On the Saturday one of the remaining Argosies left for Bordeaux to bring home H.R.H. the Prince of Wales and party. The pilot was Mr. Gordon Olley, who was accompanied by Major Brackley, and Mr. Vallette acted as wireless operator. Mr. Olley has been promoted to the rank of Major by certain Sunday newspapers, and in consequence has been presented with a few more cushions. However, although many of us often have a joke at his expense, a better choice of pilot could not have been made, and he knows the Continent better than many of us know London.

Now for the week just past. Services have all run

normally, and May 1 saw the start in earnest of the full summer services. From morning until late night is one round of hustle; every hour sees several machines in and out, and even the night itself, between 10 p.m. and 2 a.m., sees at least three machines in and out. There are at present about 36 services daily to and from Croydon, in addition to private owners, joyriders, pupils, etc., and you will get some idea of what it is like.

On Monday a Fokker F9 arrived from Holland with a full load, consisting of agents of Royal Dutch Air Lines, who had been to Holland as guests of the company. There is something very splendid looking about these machines, that seems to inspire confidence into the passengers.

Wednesday saw the return of H.R.H. the Prince of Wales, and, although he did not actually land at Croydon, but proceeded to Windsor, it meant a great deal of work for the Croydon authorities, who had to give special attention to the progress of H.R.H.'s machine, and also give the usual attention to the normal traffic. Many were disappointed that Croydon was not chosen as the landing place, and, although the Press had announced that Windsor was the chosen spot, numbers of people came to Croydon hoping that the machine would land there. One does not envy the Traffic Officer his job on these occasions. The weather on Wednesday was none too good, and he must have heaved a sigh of relief when he knew the machine had landed at Windsor, and he was able to breathe a little more freely.

A rather amusing incident occurred when it was decided to obtain a weather report of the vicinity of Smith's Lawn. A telephone call was made to a certain household for information as to visibility. Unfortunately, the owner, who is well known in the aviation world, was absent. However, the following conversation took place between Croydon and the butler:—

Croydon: "What is the visibility—how far can you see?"

Butler: "Oh! about four fields."

Croydon: "How far would you estimate the distance?"

Butler: "Oh! about five minutes' walk!!"

Another Lockheed Vega has arrived, and belongs to an American lady named Miss Durrant. This machine is still at Croydon. A Bellanca monoplane registered in Italy also arrived during the week, and proceeded to Brooklands. This is the same type as "Miss Columbia," that flew the Atlantic, and is to be used by Major Sydney Cotton on his Arctic rescue flight.

Personal Flying Services have been very busy with special charters, and on Friday they had a very delicate job to carry out. A young business man had been given only a few days to live if he remained in England, and it was necessary to get him to Switzerland in haste in an endeavour to save his life. Personal Flying Services had their junkers standing by; the invalid was rushed down from town, and the machine was away immediately. A nurse accompanied the patient. Mr. Styran was the pilot,



The opening of the Cannes Aerodrome. In the foreground are M. Lemoigne (in flying kit) and M. Tarascon, one of the creators of the Aerodrome. During the afternoon M. Lemoigne gave a fine aerobatic display on the aircraft in front of which they are standing.

and he was instructed that he must not go above 2,000 feet during the trip, as it would prove fatal to the patient, who was suffering from lung trouble. Bellinzona was the destination, and to go direct meant flying over the Alps. This was out of the question, so he had to go round them via Lyon and Marseilles. He reached Bellinzona at 6 p.m. The "Sikorsky," belonging to this company, has been sold, and I understand it is being equipped at Brooklands for a flight to the Arctic regions.

On Friday, the Marquis of Donegal travelled to Antwerp by Sabena line. Many will know him well by some of his brilliant newspaper articles. The long-awaited 40-seater has been expected every day for the past week, but so far has not appeared. One begins to wonder whether these machines really exist, or whether they are mythical. Several of Imperial Airways' pilots, however, have visited Radlett this week to test them, so perhaps we really shall see one soon. The company badly need them, particularly after the unfortunate loss of G.A.A.C.H.

I omitted to mention early on in these notes, when referring to the week ending April 25, that a large gathering was held on the Saturday by the "Riley Motor Club." Hundreds of members had booked joyrides with Henderson Aviation Bureau, but the weather was vile; gales and rain stopped all pleasure flying, which meant a great loss of business to those concerned, and the members themselves were walking about looking thoroughly dejected and miserable. Can anyone imagine a worse place than an aerodrome on a cold, wet day? It is certainly no cure for the blues.

The traffic figures for the past week were:—Passengers, 929; freight, 62 tons.

P. B.

HESTON

ABOUT 12 machines are expected to take part in the second Heston annual Spring Cruise, which is to start on Saturday, May 23, led by Mr. Nigel Norman.

After lunching at Douai, they will arrive at Rheims on the first afternoon, where a visit has been arranged to the famous Heidsieck champagne cellars. On the following day, they will lunch at Beaune, and dine at Lyons. The third and fourth evenings will be spent at Nimes, whence it is hoped to arrange expeditions to Avignon, Hyeres, etc. The following evening, they will reach the beautiful old town of Carcassonne, and on the sixth day, after lunching at Biarritz, they will arrive at Bordeaux. Passing through Poitiers, they will then make for Tours, when a personally-conducted aerial tour of the chateaux will be made. On the following day, the party will visit the Chateaux Chenonceaux and Ambroise by car, and, after lunching

at Vouvray, will return to Tours, and fly to Orly. The next day, they will return to Heston by way of Le Touquet.

The Selfridge Aviation Department have now taken a show room at Heston. The Department is run by Mr. Christopher Clarkson.

A party of 10 aeroplanes, piloted by members of the Düsseldorf Light Aeroplane Club, will arrive at Heston Air Park next Saturday afternoon, May 9, and will leave again on Sunday. While in England they will be the guests of the Royal Aero Club and of the Heston Air Park authorities.

Customs clearances outward from Heston on Saturday, May 2, were as follow:—(1) Brussels, Mr. Leslie Runciman; (2) Brussels, Mr. Brie, Autogiro; (3) Italy, Mr. Robin Cazalet, M.P.; (4) Berlin, Mr. Horace Noble; (5) Amsterdam, Mr. Richard Ince (Secretary, Stock Exchange Flying Club). School flying hours, 15 hrs. 30 mins. First soloists, Sir John Dashwood, Bart., and Mrs. Fairlie.

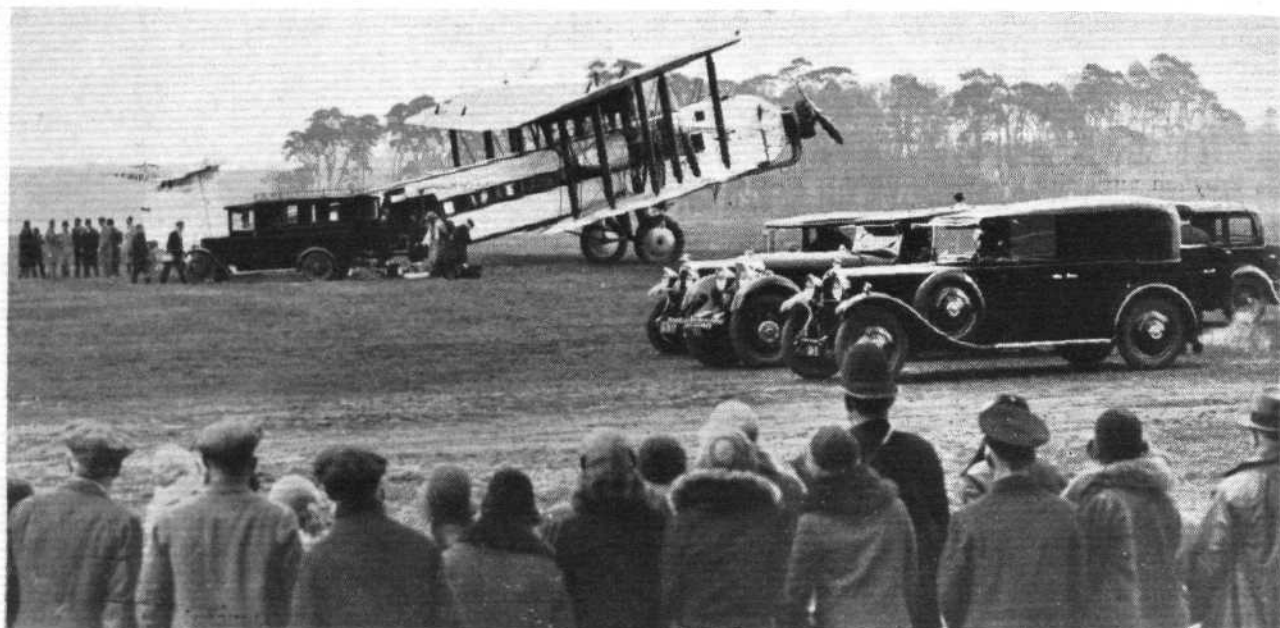
Wireless Masts and Aircraft

APART from the masts at the Tatsfield receiving station, the only other B.B.C. masts which carry beacon lights are those at Daventry and Brookmans Park (writes the Broadcasting Correspondent in *The Wireless World*). In spite

of their immense height, the Slaithwaite masts are unilluminated, apparently because no aeroplane has ever been seen near the place. But one night it seems possible that a 'plane will wander over those moors, and people in Wigan will grumble because the vaudeville is interrupted.



PRIVATE FLYING AND CLUB NEWS



A ROYAL PRIVATE OWNER: The Prince of Wales is now well known as an enthusiastic owner of aircraft. Above he is alighting, together with Prince George, on his return to Windsor from their South American tour. On this occasion he made use of an Imperial Airways Argosy, although while at Buenos Aires he made extensive flights in his own Puss-Moth.

SHOREHAM.—The weather treated the Southern Aero Club very badly indeed on Sunday, May 3, when the meeting arranged for the afternoon finally had to be abandoned on this account.

The occasion was to have marked a further step towards the completion of negotiations for the establishment of the joint Municipal Aerodrome at Shoreham, and, having been postponed owing to the weather, will take place on Saturday next, May 9. In spite of the conditions, however, many visitors arrived, and Mr. Miles' own Aerodrome on the western side of the road was fairly full of wet and bedraggled-looking aircraft with their pilots and passengers.

Col. and Mrs. Shelmerdine came down in an N.F.S. Desoutter flown by Mr. Richard Findlay, and others who got there included Mr. Everard in his own Puss-Moth flown by Miss Spooner, Col. The Master of Sempill in a Puss Moth, Mr. and Mrs. Alan Butler in a Puss Moth, Miss Winifred Brown and Mr. Ronald Adams in her Sports Avian. Mr. R. R. Bentley in the Shell Company's Moth, Flt.-Lt. Russell in the Redwing, and many others. Quite a large number also came by car, and the caterer who had arranged the lunch, in spite of having packed up his gear and being ready to go, very sportingly unpacked again and provided lunch, when it was seen that such a large number of hungry visitors had to be catered for.

Amongst those local dignitaries who are interested in the municipal scheme, and who were at the lunch, were Alderman and Mrs. Frost, the Mayor of Worthing; and Alderman and Mrs. Gallier, ex-Mayor of Bristol, who is on the Airport Committee. Mr. Laurence A. Wingfield, the Clerk to the G.A.P.A.N., was present, together with Mrs. Wingfield, and next Saturday will be of particular interest to him, since his father was the original owner of the Shoreham Aerodrome away back in the dim ages, and he will then make a speech and tell of his early experience when flying started there.

The new metal Martlet, which is briefly described on page 399, and which is now ready, was to have been demonstrated, but it was decided

that, owing to the weather, this demonstration would also better be postponed. The machine looks absolutely right and extremely comfortable, and is, we understand, well up to the estimated performance figures.

A CUP FOR NOTTINGHAM.—The Nottingham Flying Club will hold a competition on June 20 for a Cup which has been presented by "Nemos." This Cup, which is the property of the club, will be held by the winner for one year. The judges for the competition will be Capt. R. T. Shepherd, who is the Instructor in charge at Toller-ton, and Messrs. E. D. Hutchinson and F. Parnell. Mrs. Wing, the mother of Mr. R. L. Wing, who was killed in a crash at Cotgrave some time ago, has presented a hard tennis court, which will be built behind the club, in memory of her son.

A MEETING AT CLEETHORPES.—The Hospital Committee at Cleethorpes is, in conjunction with the newly formed Lincolnshire Aero Club, holding a small one-day meeting on Saturday, June 6. It is hoped by this to foster interest in flying in the district, and, not only to benefit the hospital funds, but also to place the club upon a firmer basis than it is at present. All those in the North who are not going to any other meeting on this day should make a point of visiting Cleethorpes.



A WELL-KNOWN PRIVATE OWNER: Sir Philip Sassoon's new Puss-Moth. (FLIGHT Photo.)



A BROOKLANDS VISIT: Capt. Hawks with the staff of Brooklands Flying School and some of the test pilots at Brooklands on the occasion of his recent visit there. (FLIGHT Photo.)

BROOKLANDS.—The repair shops at Brooklands have for the past week been exceptionally busy, the staff working overtime until 10.30 p.m. The engine-testing benches are being kept busy on private owners' engines, where they are completely overhauled by Thomson & Taylor. Mr. J. V. Carden's Gipsy I Moth has been through the shops for renewal of C. of A., and, by fitting a new straight undercarriage, new five-gallon petrol tank, and testing the machine with various airscrews, a further ten miles has been successfully added on to the air speed.

With the installation of the new spray-doping plant, now in progress, the repairs department has been brought right up to date.

On Wednesday, Capt. Frank Hawks flew over to lunch, the representatives of various firms around the track gave him a hearty welcome, and he took a great interest in the Hawker Fury and Vickers Secret Pusher, also many other machines produced at Brooklands. He was made a member of the Club, and had a conversation with Ft.-Lt. Waghorn.

Three new pupils have joined the School, and things generally are very brisk, including the workshops of Vickers, Ltd., and the Hawker Engineering Co.; the latter is turning out the "Fury" at the rate of two a day.

THE SCARBOROUGH Aero Club.—A Light Plane Club has been formed at Scarborough, where the racecourse has been turned into an Aerodrome. The first machine to be ordered is a Redwing, which will be used for instruction.

The subscriptions have been fixed at £5 5s. per annum for flying members and £1 1s. for non-flying members.

The headquarters of the club at present are at the Pavilion Hotel, at which address those interested should write to the Secretary. One of the first actions of the club

will be to give a pageant at the Aerodrome on Whit-Monday.

The Aerodrome is two miles west of Castle Hill and the town, and is marked by a white circle and a wind stocking.

A SENSIBLE SCHEME.—Mr. Lindsay Everard has already proved himself to be a live wire in the matter of aviation, and his latest scheme will undoubtedly do a very great deal to popularise flying in Leicestershire. He has successfully completed negotiations with the towns of Loughborough, Market Harborough, Hinckley, Colville, Ashby-de-la-Zouch, Lutterworth, Melton, Syston and Sileby to paint their respective names upon the tops of their gasometers. In Leicester itself, the name will be painted on two gasometers.

CINQUE PORTS Flying Club.—The Cinque Ports Flying Club put in 31 hr. 30 min. flying for the week ending May 2. On Wednesday, April 29, Mr. Chen-Chia-Dee, the club's second Chinese pupil, passed all the tests for his "A" licence satisfactorily.

The postponed competition for the Ashwell-Cooke Challenge Cup will be flown at 3 p.m. on Sunday, May 10, and it is hoped that all private pilots who want an afternoon's amusement will go down and compete. All visitors will be made honorary members for the day.

THE COST OF FLYING.—Those who are interested in statistics of the cost of flying, should write to the De Havilland Co., Stag Lane, Edgware, for a bulletin recently issued by the De Havilland Aircraft of Canada, Ltd., which shows the cost of operating a Puss Moth in that country.

A HOUSEHOLD BRIGADE MEETING.—The Household Brigade Flying Club will hold a meeting at Heston Air Park on Wednesday, July 22, from 3—5 p.m. The Household Brigade meetings have always been exceptionally well attended, and rightly so, and those who are able to attend, but who do not do so, will be missing a very enjoyable meeting.

AN ANNIVERSARY.—On Saturday, May 9, a luncheon will be held at Hanworth Club, at which Mr. Griffith Brewer will be the guest of honour. The occasion will commemorate the anniversary of his first flight, which took place in a balloon from Chelsea 40 years ago.

Mr. Griffith Brewer has now taken up flying again, and is now the owner of a Moth, which he keeps at Hanworth and flies regularly.



HOME BUILT: Mr. E. A. Alton, of the Bombay Flying Club, by the aircraft which he has built for himself. The engine is an A.B.C. Scorpion, and on test the machine has proved exceptionally satisfactory.



GLIDING



GLIDING and Meteorological Knowledge.—On Wednesday, April 22, Capt. Entwistle visited Leeds under the auspices of the British Gliding Association, and gave a lecture on meteorology as it affected gliding. He explained the clouds and their formation, and the use of those for soaring, particularly as it applied to cumulus clouds and line squalls. He stressed the importance of a knowledge of meteorology by those who wish to become proficient in the art of soaring. Cumulus clouds, he said, tend to go along in lines, and with the help of these it is, therefore, possible to select a definite line and to carry out long cross-country flights. He also visualised glider pilots being able to make use of line squalls as they travel across country at 30-40 m.p.h., and since these travel from West to East, he said he thought it possible for a glider to cross the Channel in front of a line squall. When asked whether the success of some of the German pilots was due to their knowledge of meteorology, Capt. Entwistle said that Herr Kronfeld and many others were as much at home in the Meteorological Office as in a sailplane.

THE LONDON Gliding Club.—The London Gliding Club has been greatly hampered by bad weather conditions recently, and besides the wind being in an unfavourable direction, there were a large number of heavy showers. Mr. Lowe Wylde demonstrated his two-seater glider, and, after making a test flight solo, he landed at the bottom of the hill, picked up a passenger, was then auto-towed to about 500 ft., after which he was able to cut loose and soar along the ridge for ten minutes, finally landing at the top of the hill. After a period of rain he again took off solo and soared for 1 hr. 31 min., which would appear to be the record duration for a British pilot in an all-British machine. During this time Mr. McCulloch, on one of the club's Prüfings, also put up an excellent performance.

THE AIRCRAFT CLUB, HARROGATE has now concluded its tour of exploration in Nidderdale, and after seven weeks' hard work the glider has been brought back to headquarters intact. A great deal of useful information concerning the air currents has been gained, and sailplane routes for various wind directions have been mapped. Several soaring flights have been made, as well as frequent cross-country flights of a mile or so in length.

The presence of thousands of sheep and lambs will cur-

tail the gliding activities for some months, but a local gentleman has placed his park at the disposal of the club, where they will be able to carry on primary training.

SOUTHERN Soarers' Club.—The Southern Soarers' Club will be holding an Inter-Club Contest and Rally at Balsdean during Saturday, Sunday and Monday, May 23-25. Arrangements have been made for a North v. South Contest for teams of four in a soaring competition, to be decided by the highest aggregate of maximum altitude attained within fifteen minutes of launching. Sealed barographs will be used. There will also be an individual Contest open to club or private owners for the quickest time round two pylons on a ridge. Three complete figures of eight will have to be made from the central starting point. There will also be a spot landing inter-club competition for primary machines. The route will be an "S" round two pylons on the way down hill, each club being allowed four flights. Finally, there will be a distance competition on Prüfings or intermediate machines. If Mr. Bramble is informed at least seven days beforehand, it will be possible for him to arrange for the hire of tents for those wishing to camp on the site; such people must, however, make their own arrangements for food and bedding. All communications should be addressed to Mr. A. Yorke Bramble, New Yorke Hotel, Bedford Square, Brighton.

A GLIDER EXHIBITION.—A Glider Exhibition has been organised in part of the space of the used Motor Show organised by Mr. Glass in the Agricultural Hall, Islington, from May 6-16. This will be held under the auspices of the B.G.A., and we anticipate that Londoners will be able to see a very wide range of machines.

"NIPPY" GLIDING.—Lyons' Tea Dept. are organising gliding demonstrations throughout the summer, for which purpose they have got Herr Krause over here, and he gave his first demonstration on May 2 and 3 at Forest Lodge, Glanrhyd, Brecon. The machine Herr Krause will use will be a Westpreussen, christened the "Cloud Yacht," and also a Falke.

The following is the list of places at which the demonstrations will take place:—

- May 9 & 10.—North Cotswold Club. The Tower, Broadway.
- May 16 & 17.—Preston and District Club. Beacon Fell, 9 miles from Preston.
- May 23-4 & 25.—Ilkley and District Club. Woofa Bank, 5 miles from Ilkley.
- May 30 & 31.—Scarborough Club.
- June 13 & 14.—Glasgow Club. Compsey Fell.
- June 20 & 21.—Stirling and District Club. Sheriffmuir.
- June 27 & 28.—Nottingham Club. Dovedale.
- July 4 & 5.—Bradford Club. Ambler Thorne, off Roper Lane, Queensbury.
- July 11 & 12.—South Shropshire and North Herefordshire Club.
- July 18 & 19.—Oxford County Club.
- July 24 & 25.—Wiltshire Club. Olivers Castle, Devizes.
- Aug. 1-2 & 3.—Southdown Skysailing Club. Ditchling.
- Aug. 15 & 16.—Channel Club. The Valiant Sailor, Dover Hill.
- Aug. 22 & 23.—Isle of Wight Club. Afton Down, Freshwater.
- Aug. 29 & 30.—Portsmouth and Southsea Club. Portsdown Hill.
- Sept. 5 & 6.—London Club. Dunstable Downs.

The demonstrations are, of course, frankly a publicity stunt for Lyons' Tea, and, to further this end, at each meeting a demonstration car will be in attendance from which free cups of Lyons' Tea will be distributed. In spite of this, however, there is no doubt that the series will raise an immense amount of interest in gliding, and for this reason all clubs should be grateful to those who are running the scheme. The same organisation will also provide public speaking arrangements whereby the officials of the clubs, who know what they are talking about, will be able to tell the spectators all about what is going on.



The M. H. Volk Cup which has been presented to the B.G.A. This will be competed for annually in an Inter-Club competition, the lines of which will be decided according to the development of the sport at the time of the competition.

AIR TRANSPORT

DEVELOPMENT IN YUGOSLAVIA

YUGOSLAVIA is making every effort to develop commercial aviation, not only as regards the operation of air services, but in building up an aviation industry as well. This summer a new internal air line will be opened, connecting Belgrade, Sarajevo, Split, Sushak, and Zagreb—a distance of nearly 500 miles. This service will be maintained by the Yugoslavian Airways Company Aeroput, which has run the Belgrade-Zagreb-Graz-Vienna, the Belgrade-Sarajevo-Podgorica, the Belgrade-Skoplje-Salonika, and the Zagreb-Susak lines, for three years without a single accident. This company work in active collaboration with the Compagnie Internationale des Navigation Aériennes (C.I.D.N.A.), the Austrian Austroflug Company, and the Checho-Slovakian Ceskoslovenske Statni Aerolinie Company, to improve flying communications in Eastern Europe.

Air transport was first inaugurated in Yugoslavia by the French company C.I.D.N.A. in 1923, when it established its Orient line, which passes through Belgrade from Budapest, in serving Bucharest, and Sofia.

The development of the Aeroput has been extremely rapid. Founded and subsidised by the State as recently as 1927, between 1928 and 1930 it has risen from covering 148,840 kilometres, and carrying 1,322 passengers, to covering 432,263 kilometres and carrying 3,184 passengers, while the weight of mail transported has increased from 37 kilograms to 2,849 kilograms, and that of freight from 7,010 kilograms to 25,604 kilograms, between 1928 and 1930.

At present the network of Yugoslav airways links Belgrade, the capital, with all neighbouring countries except Italy and Albania, as well as connecting up the principal districts of the kingdom. It will be seen that the Imperial Airways route to India, as recently operated, also passes through Belgrade.

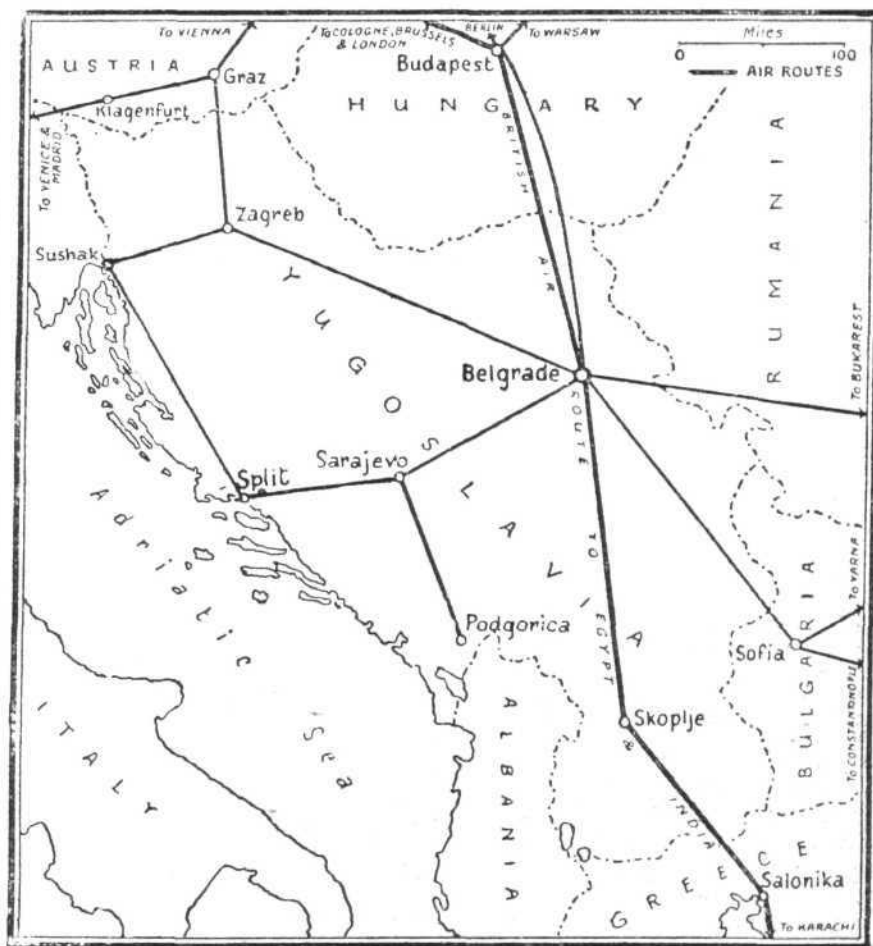
A new departure in aviation in Yugoslavia has recently taken place with the decision of the Aeroput Company to enter the field of air-taxi work. This company has recently purchased from the de Havilland Aircraft Company one of the latest type Puss Moth cabin monoplanes with which to inaugurate this service. The air taxi will not only be available in Yugoslavia itself, but Aeroput intend also to arrange facilities whereby travellers on the expresses, which reach Belgrade from France and Germany in the morning, may be taken on by air to such places as Athens and thus reduce a wearisome 36-hour train journey across the Balkans to a five-hour trip in a Puss Moth. Also, for the many business men who go from Belgrade to Bucharest, the air-taxi service will be a boon, since they can make the journey in comfort by air with a saving of over 23 hours on the normal and most uncomfortable train journey.

Mr. Sondermayer, Director-General of Aeroput, recently came to England with his chief pilot to take delivery of the new machine, and they both flew to Belgrade in the Puss Moth. A telegram was received by the de Havilland Aircraft Company stating that the Puss Moth had successfully flown from Paris to Belgrade in an

afternoon, and was immediately being put into service as an air taxi.

A novel scheme to get the population used to travel by air has just been launched in Yugoslavia. The Yugoslav Aero Club, which exists to promote civil aviation, and has over 224 branches in different parts of the country, is organising short flights at the purely nominal figure of from 3s. 6d. to 7s. per flight, with the sole object of getting people accustomed to travel by aeroplane.

The Yugoslav Aero Club, it may be added in conclusion, has accomplished much good work since it was founded in 1922 under the patronage of H.R.H. the Crown Prince and the presidency of H.R.H. Prince Paul. It is affiliated to the F.A.I., and has stimulated and organised aerial sporting contests in the country. Among the different events must be mentioned the big annual trial, the Little Entente and Poland race, over 3,000 kilometres, between the four capitals. It was organised for the first time in 1927 by the Yugoslav Aero Club, and in the succeeding years by the aero clubs of the other four countries.



The Airways of Yugoslavia. (Courtesy Manchester Guardian.)

Local committees are planning landing grounds, and funds for the purchase of aeroplanes are flowing in satisfactorily. A light squadron, comprising several machines, is the first result of the propaganda which has been carried on, but it represents only the beginning of a big programme.

Air Mail for Canada

THE Postmaster-General announces that a new combined sea and air service to Canada will be available as from to-day (May 8). Letters posted in time for the direct Canadian Pacific Railway steamers sailing twice a week from this country will be carried from Rimouski, on the St. Lawrence River, by aeroplane to Montreal and beyond, and should normally gain about one day to Montreal,

Ottawa and Toronto, and up to two days to Winnipeg and beyond. The latest times of posting at the General Post Office, London, will be 2 a.m. on Wednesdays and, normally, 6 p.m. on Fridays. The latest times of posting elsewhere can be ascertained at local Head Post Offices. The combined air fee and postage payable will be:—2½d. for the first half-ounce and 1½d. for each succeeding half-ounce.

300 HOURS' TEST OF BRISTOL "JUPITER" X.F.BM.

THE recent general tendency to turn to lubricating oils of the mineral type in place of the vegetable type oils previously used for high-powered high efficiency aero engines, has led to considerable research on the part of the oil manufacturing companies in an endeavour to improve the qualities of mineral oils, particularly in respect of the anti-sludging and "oiliness" factors. An oil recently developed by Shell Mex. Ltd., has shown excellent promise in these respects. This new oil, known as "Aero Shell," is a mineral base oil with a small percentage of fatty matter, and is produced by entirely new and special processes.

As experience has shown that a prolonged main engine test under service operating conditions is essential before a lubricating oil can be accepted as fully satisfactory, the Shell Company arranged with the Bristol Company for such a test to be carried out on one of the "Bristol" Jupiter X.F.BM. moderately supercharged and geared type engines, as ordered for Imperial Airways' new aircraft for the London-Cape Town air route.

A duration of 300 hours was agreed upon as a reasonable period for demonstrating the properties of this oil, and in order to obtain the maximum information on the progressive changes in the internal condition of the engine throughout the test, the latter was stripped for inspection at the end of the 50, 150 and 300-hour periods.

The test included 30 hours on the dynamometer at full-

rated R.P.M. and 90 per cent. full power, and the remainder on the hangar with the engine opened up for 5 minutes at the end of each 5-hour period to approximately 580 B.H.P. and 2,200 R.P.M.

During the first 150 hours, the hangar test was carried out under actual cruising conditions of B.H.P. and R.P.M., but as the condition of the engine at the end of the first 150 hours was particularly satisfactory, the test was increased in severity for the final 140 hours on the hangar, commencing at 365 B.H.P. at 1,900 R.P.M. and increasing to 428 B.H.P. at 2,000 R.P.M. for the concluding 57 hours.

Although the average oil consumption over the whole of the 270 hours on the hangar was under 7 pints per hour, or 0.0019 pint per B.H.P./hour, from the excellent condition of the engine bearing surfaces it was obvious that the desired standard of lubrication had been maintained, and the notable absence of sludge, with the small amount of carbon deposit observed during the intermediate and final inspection, showed that a marked advance has been made with this oil in these very important characteristics.

As a supercharged and geared engine of this type with such a high power output affords very severe test conditions, the test of this oil can be considered particularly satisfactory. As a result, the Bristol Company are, we are informed, quite satisfied to use this oil in future and to recommend it, without reserve, for use in their engines.

SAILS AND AERODYNAMICS

DR. MANFRED CURRY, speaking before the Royal Aeronautical Society at the Royal Society of Arts on April 30, raised many interesting points with regard to his theories about the aerodynamics of sails. The audience was large, since members of the Royal Thames Yacht Club, as well as many yacht designers, had been invited.

Mr. Fairey, the President of the Royal Aeronautical Society, was in the Chair, and expressed the opinion that the occasion was one of great importance, particularly to yachtsmen, since he thought that very little had been done to improve the aerodynamical characteristics of yachts, and, as far as he knew, he himself was the first man to have a model of the hull of his yacht tested in the tank. Incidentally, before doing so, he said he had made a bet that the drag backwards was just the same as if going forwards, and the tank had proved him to be right. He said that he did not think that a very great deal had been done to improve the design of hulls, and he pointed to what had been achieved with the floats of seaplanes, where, with the help of the N.P.L., we had reduced the drag of seaplane floats to a quarter of what it was three years ago. Dr. Curry is the undisputed small boat sailing champion, and, though an American subject, he comes from Germany, where the science of small boat sailing is more greatly developed than in any other country. Dr. Curry's lecture took the form of a long cinematograph film, with

explanations by himself. He drew an analogy between the wings of many of the birds and the sails of our smaller sailing craft. He showed extraordinary clear pictures illustrating the airstream over curved and flat surfaces, and also the effect of slot mechanism, such as the Handley Page. This slot effect, he said, was also obtained in sailing by use of the foresail, which was brought a long way aft behind the mainsail, thereby acting as a slot to it.

His theories offered on the subject of sails in general, particularly those wherein he maintained that a very arched sail offered less drag and thereby increased the speed of the boat, are undoubtedly worth serious study, and should afford a field of very wide scope for investigation. In many ways his contentions certainly did not appear comparable to the facts of aerodynamics as we know them in aircraft, but without a very much greater knowledge of sailing we should hesitate to enter into controversy with such an acknowledged authority as Dr. Curry.

The last three-quarters of his film were confined to the tactics of racing, and illustrated methods whereby one boat might obtain advantage over another one through skilful handling, which would result in blanketing and otherwise impeding the progress of the boat it was desired to overhaul. The photography throughout was magnificent, and we must congratulate Dr. Curry on having got together such an attractive and admirable film.

Death of Lieut.-Commander Glen Kidston and Mr. T. A. Gladstone

WE very deeply regret to announce that on Tuesday, May 5, news was received from Van Reenan, Natal, that a "Puss Moth" had crashed among the Drakensburg Mountains in a storm, and that its two occupants had been killed. The bodies were identified as those of Lieut.-Commander Glen Kidston and Mr. T. A. Gladstone.

Glen Kidston had become famous for his numerous narrow escapes from death. Early in the war, when he was a midshipman, he was on board the cruiser *Hogue* when she was torpedoed by a German submarine. He had several narrow escapes when engaged in motor racing. Two years ago he was the only survivor of a Junkers machine which crashed near Caterham and caught fire. Only the other day he established a record by flying from England to Capetown in 56 flying hours in a Lockheed "Vega" with "Whirlwind" engine, with Mr. Cathcart Jones as second pilot. He leaves a widow and a son aged four.

Mr. T. A. Gladstone was the first man to attempt a commercial seaplane service in Africa. In conjunction

with the Blackburn Co., he initiated a service between Khartum and Kisumu, using a D.H.50 with "Jupiter" engine on floats. The machine was christened the "Pelican." This machine and another were, however, damaged when taxiing, and the service had to be abandoned.

Flight-Lieut. Waghorn Injured

ON Tuesday, May 5, Flight-Lieut. Waghorn, A.F.C., winner of the last Schneider Contest, was testing a Hawker Horsley machine at South Farnborough, accompanied by Mr. E. R. Alexander, a civilian expert in engines at the Royal Aircraft Establishment. For some reason the machine got out of control, and at about 500 feet both men jumped with their parachutes. Mr. Alexander jumped first and landed on a glass roof, which cut him somewhat. Waghorn was carried along by a strong wind, and came violently into contact with another building. He broke his thigh and sustained other injuries. Both men were taken to the Cambridge Hospital at Aldershot, and a specialist was sent for to examine Waghorn. It was decided not to operate that night. Next morning Waghorn recovered consciousness, but remained in a dangerous condition.

AIRISMS FROM THE FOUR WINDS

The Prince Flying to Manchester

ON May 12 the Prince will fly to Manchester to address the Chamber of Commerce. He will lunch privately with Lord Derby, and after tea with the Lord Mayor of Manchester will fly back to London.

King Albert in an Autogiro

WHEN a Cierva Autogiro, piloted by Mr. Brie and with Lord Stonehaven as passenger, arrived at St. Ingelvert Aerodrome on May 2, King Albert of Belgium, who was also visiting the aerodrome, expressed a wish to go up in the machine. Although the Queen indicated some anxiety, the King climbed into the cockpit, and was taken for a ten-minute flight, with which he was extremely pleased—saying "what a wonderful invention."

Capt. Stack and the Australian Flight

AFTER three abortive starts, Capt. Stack and Mr. J. R. Chaplin succeeded in reaching Constantinople in one day. They left Lympne at 4.22 a.m. on Saturday, May 2, and reached Constantinople at 9 o'clock the same night. The journey of 1,660 miles was made in 15 hr., with only one stop of 40 min. at Vienna. The continuation of the flight was, however, abandoned owing to the uncertain behaviour of the engine, and the return journey was made to Heston in 14 hr. 45 min. on Monday, May 4. Capt. Stack has announced that work will be started at once on overhauling the engine, and that, if possible, another start will be made for the flight within a few days. The machine, which has already been described in FLIGHT, is a Vickers Napier, with a cruising speed of some 135 m.p.h.

Tommy Rose starts for Home

FLIGHT-LT. TOMMY ROSE left Maitland Aerodrome, Capetown, at 3 a.m. on May 1 in his Avro Avian, *en route* for England—in, he hopes, 4½ days. He made a non-stop flight to Bulawayo, covering 1,100 miles in 12¾ hours. After a spell of sleep, he left again at midnight, and made another fine hop of 1,120 miles to Tabora. On May 3 he flew on to Kisumu, and left again shortly after towards Khartoum. He passed over Malakal on the afternoon of May 4, and reached Khartoum at 5 a.m. on May 5. Proceeding half an hour later, his splendid progress received a check, for he had to make a forced landing at Esna, 30 miles south of Luxor, and damaged his machine.

Mrs. Montagu Crashes

THE Hon. Mrs. Edwin Montagu and her pilot, Mr. Rupert Belville, who are making a tour of Persia and Soviet Russia in a Gipsy Moth, met with a mishap on May 2 when flying from Teheran to Moscow. Their machine crashed near Sabzawar, Persia, and, although the machine was burnt, they were both unhurt.

Tokio-San Francisco Flight Starts

THE Japanese pilot, Seiji Yoshihara—who flew from Berlin to Tokio last August—left Tokio on May 4 on the first lap of his flight to San Francisco across the Pacific, via the Aleutians. He is flying a Junkers Junior monoplane (Armstrong-Siddeley "Genet") equipped with floats, and proposes to complete the 6,000 odd miles in two stages. He reached Numasaki, N.E. Japan, thus completing the first lap of his flight.

Long Polish Flight Completed

TWO Polish pilots, Capt. S. Skarzynski and Lt. A. Markiewicz, landed at Warsaw on May 4, after a flight of nearly 14,000 miles over Europe and Africa in a Polish-built machine fitted with a Wright engine. They left Warsaw on February 1.

DO.X. Resumes

THE German flying boat DO.X, which had been undergoing repairs at the Canary Islands since February, resumed her flight on May 1, making for the African coast, on her way to South America, and, flying via Villa Cisneros, arrived at Bolama.

Visit of Belgian Air Squadron

ON Tuesday, May 5, a squadron of Belgian aircraft arrived in this country, under the command of General Gillieaux, who is the head of the Belgian military Air Service. The Belgians landed at Manston, and visited No. 2 (Army Co-operation) Squadron and the School of Technical Training. They stayed the night at Manston, and were due to proceed on Wednesday morning to Worthy Down. After luncheon they were to visit Nos. 7 and 58 (Bomber) Squadrons, and stay the night there. Next day they were to proceed to the practice camp at North Coates Fitties, and to visit the camp of Nos. 35 and 207 (Bomber) Squadrons. They were then to proceed to Cranwell and stay

the night. On the following day they were to visit the R.A.F. College, and then proceed to Grantham and visit No. 3 Flying Training School. On Saturday they will proceed to Hornchurch, visit No. 54 (Fighter) Squadron, and, after lunch, proceed to Manston, where they will stay the night, before departing for Belgium.

League of Nations Advisory Committee Appointed

VICE-ADMIRAL DREYER has been appointed to succeed Vice-Admiral Anderson as British representative on the Permanent Advisory Committee of the League of Nations for military, naval, and air questions.

The Late Air Vice-Marshal Sir Sefton Brancker

THE following donations have been received by The Royal Aero Club towards the cost of an oil painting of the late Air Vice-Marshal Sir Sefton Brancker:—Royal Aero Club, £21; Petroleum Distributors' Committee, £10 10s.; Captain H. Barber, £5 5s.; Liverpool and District Aero Club, £5 5s.; A. C. M. Jackaman, £2; Lieut.-Col. Sir Francis McClean, Commander James Bird, F. Handley Page, C. R. Fairey, M. S. Abrahams, John Lord, D. Longden, H. Burroughes, Wing-Commander R. L. G. Marix, A. J. A. W. Barr, £1 1s. each. Donations should be sent to The Royal Aero Club, 3, Clifford Street, London, W.1.

Captain Hawks visits Ireland

CAPTAIN FRANK HAWKS paid a "flying" visit to Ireland on April 30, in his Travelair machine "Texaco 13." His speed for the flight averaged 182 m.p.h., and he covered the distance between Heston and Baldonnel, Co. Dublin, 320 miles, in 100 minutes. On arrival at Baldonnel, Captain Hawks was met by Mr. A. J. Singleton, managing director of the Texas Company (of Ireland), Ltd.; Mr. James O. Denby, Secretary of the American Legation in Dublin; Captain Hannon, Acting Officer Commanding the Free State Army Air Corps, and a few members of the Irish Aero Club. After lunching off a few sandwiches and a bottle of beer, Captain Hawks left Baldonnel on a tour of the Free State. His times were:—Baldonnel-Cork (159 miles), 42 minutes; Cork-Limerick (64 miles), 15 minutes; Limerick-Galway (62 miles), 17½ minutes; Galway-Athlone (58 miles), 15 minutes. The distances given are approximate. After his return to Baldonnel, Captain Hawks expressed the opinion that a fast mail-plane service between Galway and London would be of great



Capt. Hawks at Brooklands. This photograph shows the rapid sweep-in of the fuselage in the region of the pilot's cockpit. The very complete windscreen fairing over the cockpit is seen easily from this view. [FLIGHT Photo.]

assistance to Anglo-American trade; Galway is now a port of call for Atlantic liners. Shortly before 9 a.m. on May 1, Captain Hawks left Baldonnel to return to London, via Belfast, Manchester and Leeds, and he was reported in Dublin as having arrived at Heston at 11.52 a.m. Captain Hawks has promised to do his best to pay a second visit to Ireland before he returns to the United States.

The Search for Mr. Courtauld

THE Swedish pilot, Capt. Ahrenberg, in his Junkers F13, flew to Angmagssalik, in Greenland, on May 3, carrying skis for one of the Moths which belong to the Watkins expedition. The seaplane, which was taken to the edge of the ice barrier on the patrol boat "Odinn," developed engine trouble on a trial flight, and may have to be taken back to Iceland. Meantime, Major Sydney Cotton, accompanied by Flight-Lieut. E. D. Barnes, R.A.F., as navigator, has sailed from Hull with a Bellanca monoplane mounted on skis and equipped with a complete Marconi wireless installation. Major Cotton, whose name is commemorated by the Lydcott flying suit, was the first man to attempt to use an aeroplane to spot seals on the icebergs for the Newfoundland sealing fleet. On that attempt he chiefly used a Westland Limousine landplane with Napier "Lion" engine. Major Cotton also entered D.H.14 (also with "Lion") for the Cairo to Capetown flight, but did not get beyond Italy. We have not heard of his doing much flying of late, but his experience of the Northern Atlantic should be valuable.

British Exhibits at Stockholm

BRITISH participation in the International Aero Show, which opens in Stockholm on Friday, May 15, is not quite as extensive as could have been wished. Doubtless this is very largely due to the fact that the British Aircraft Industry as a whole made a very strenuous effort in connection with the Buenos Aires exhibition, the closing date of which also rather precluded the possibility of getting exhibits from South America to Sweden in time. There is still a possibility that one or two more firms may decide to exhibit in the "stationary" part of the Stockholm Show, but at present the list is confined to the Armstrong-Siddeley and Armstrong-Whitworth firms, the Bristol Aeroplane Co. (per their Swedish licensees, Nydquist & Holm), Smith's Aircraft Instruments, and Reid & Sigrist, who will exhibit their testing apparatus on the stand of the Vacuum Oil Company of Stockholm. The De Havilland Aircraft Co. will not actually be exhibiting any complete machines, but have made arrangements with the S.K.F. Company to have a certain number of parts, &c., shown on their stand. What, apparently, several British firms intend to do is to send machines to the Stockholm aerodrome for demonstration purposes during the exhibition. De Havillands will send over a military type Gipsy-Moth, in charge of Captain Broad, and it is reported likely that the Cierva Autogiro Company will send one of their machines over to give demonstrations. Several other firms are considering the matter, and doubtless there will be quite a number of British aircraft giving demonstrations during the show. The Stockholm Aero Show, as already stated, opens on Monday, May 15, and remains open until May 31. Firms wishing to make arrangements in connection with the exhibition should write to the Secretary of the I.L.I.S., Kungsgatan 33, Stockholm.

Command of the Fighting Area

THE Air Ministry announces the following appointment:—Air Commodore Frederick William Bowhill, C.M.G., D.S.O., now Director of Organisation and Staff Duties, Air Ministry, to be Air Officer Commanding, Fighting Area, Air Defence of Great Britain, with effect from May 5, 1931. Air Commodore F. W. Bowhill was appointed to the Royal Flying Corps (Naval Wing) in April, 1913. He served with the Royal Naval Air Service during the war; in addition to being made C.M.G. and receiving the D.S.O. and Bar, he was mentioned in despatches on no fewer than six occasions. He was given a permanent commission in the Royal Air Force in 1919, and has subsequently served in Somaliland, Egypt and Iraq. He became Chief Staff Officer, Iraq Command, in May, 1928, and a year later was appointed Director of Organisation and Staff Duties at the Air Ministry. He was promoted to the rank of Air Commodore in July, 1928.

Italian Air Manoeuvres

THE Italian Royal Air Force will hold air manoeuvres in August over a district in the Appennine Mountains. Seven hundred aeroplanes will be employed.

R101 Inquest Closed

MR. INGLEBY ODDIE, the Westminster coroner, closed the inquest on the victims of the R101 disaster on May 5.

The inquest had been adjourned until the report of the Simon inquiry was published. A verdict of accidental death was recorded.

K.L.M. Entertains

ON Saturday, April 25, an interesting week-end tour was arranged by K.L.M. for eighteen Heads of the leading London Travel Bureaux. Leaving Croydon Aerodrome at 1.30 p.m. in the latest addition to the K.L.M. fleet, the 3-Jupiter engined Fokker F. IX, which took the "Grand Prix d'Elegance" at the last Paris show, and which is the last word in comfort and tasteful interior decoration, Rotterdam was reached in 1 hour 55 minutes. The programme arranged for the K.L.M. guests included inspection of the Aerodromes of Waalhaven and Schiphol, visits to the towns of Rotterdam, Amsterdam, The Hague and Scheveningen, tours by motor car of the bulb fields now ablaze with hyacinths, and motor boat cruises on the Dutch lakes. The party was afforded an opportunity to test the famous Dutch cuisine and accommodation at several of the best-known restaurants and hotels in Holland, and finally returned to Croydon in the F.IX on Monday in excellent shape. It is, perhaps, noteworthy that though Monday was a bumpy day, everybody landed perfectly fit and loud in their praises of the steadiness of the big Fokker. There is no doubt that the Air Traffic Company's best friend is the Travel Agent, who, if he can recommend the fastest and best means of transport from personal experience and talk with honeyed tongue about the beauties and pleasures of the country to be visited by air, can bring many a tourist to the Air Traffic Company who otherwise might prefer the less enterprising and more old-fashioned means of travel.

Aircraft at the Used Motor Show

MR. WILLIAM GLASS, who has organised the Used Motor Show at the Royal Agricultural Hall every year since 1916, has this year included an Aircraft Section, a Glider Section and a Caravan and Trailer Section. The Aircraft Section has, as one would imagine, not a great number of aircraft in it, for this is its first year, but on Tuesday, May 5, the day of the opening luncheon, there were some five Moths and a Widgeon on view.

The Glider Section, which has been arranged by the British Gliding Association, will form an exhibition of almost every type of glider. The London Gliding Club, E. D. Abbott, Ltd., of Farnham, the makers of the "Scud," and the "Sailplane," all have Stands, and when the section is finally arranged it should have a great appeal to the growing section of the community who are interested in this cheap form of flying.

Col. The Master of Sempill, who presided at the opening Luncheon, stressed the point that many well-known people had started their flying careers on second-hand aircraft, and quoted Miss Amy Johnson as an example. He also referred to the growing interest of the general public in gliding, and said that at the first demonstration arranged by Lyons' Tea Department last week-end, there were over 5,000 people present, and Herr Krause, the German pilot who has come over for the demonstration, succeeded in making a flight of over 3 hr. and reached an altitude of 3,000 ft.

He laid emphasis on the importance of country garage-owners taking an interest in aviation, wherever this was possible, by arranging that a field adjoining their premises could be used as a landing-ground, and that their organisation should cater for refuelling and servicing aircraft. This, he said, had already been done in a good many cases, and had proved a great success.

The Show will be open from May 6—16, and there is no doubt that apart from the actual aircraft and gliders to be shown, the used cars themselves will have a great attraction for people who are desirous of purchasing a reliable second-hand machine.

An innovation made this year is the establishment of a mechanical testing section through which every car has to pass before inclusion in the Show. This has been arranged by Mr. Frost, of Harvey, Frost & Co., Ltd., 148, Great Portland Street, W.1, and forms a complete test of the actual horse-power delivered at the road wheels, the efficiency of all brakes, and finally the fuel consumption. A certificate is provided with every machine on sale showing the actual state of the car after it has been through the test. Mr. Glass hopes eventually to elaborate this, and to found a sort of N.P.L. for testing used motor cars, where the general public may have a car which they propose buying, thoroughly tested.

A.I.D. ANNUAL DINNER

A NEW note was struck at this year's Annual Dinner of the A.I.D. Technical Staff Association. Not only had the venue been changed to the Holborn Restaurant, but the fact that the guests included such very distinguished personalities as His Royal Highness Group Captain the Duke of York, and the Secretary of State for Air, Lord Amulree, resulted in a subtle change in the tone of the proceedings. Not that the dinner was in any sense a "formal" one. Far from it. As on previous occasions, lounge suits were worn, and when the smoking stage arrived, many pipes were brought out. But the presence of such prominent people could hardly fail to make itself felt in the general tone of the speeches, and in many other and smaller ways. On the whole, the change (slight as it is) is probably to be welcomed, for, if we missed some of the "stories" and biblical quotations of former A.I.D., T.S.A. dinners, the acceptance of invitations by such highly-placed people must go to show that the Association has now attained a state of importance, very different from that which could be claimed when the first two dinners were held, and which are not now deemed worthy of being counted in the list of annual dinners, that held last Friday being officially counted the sixth, although Col. Outram pleaded guilty to having spoken at seven previous dinners.

The Menu Card this year was a most informative affair, and contained data relating to the A.I.D. which were evidently included mainly because the dinner has now definitely ceased to be a "family affair," and some of the guests cannot be assumed to know a great deal about the A.I.D. For example, the Menu Card revealed the official secret that headquarters of the A.I.D. are at Alexandra House, Kingsway, while A.I.D. Branch Offices are located in Clements Inn, London, at Birmingham, Sheffield, Edinburgh, Bristol and Manchester. A.I.D. stations overseas are situated at Heliopolis, Kisumu, Hinaidi and Aboukir. The diners were also informed that there are A.I.D. resident inspectors and staff at 18 aircraft works, six aero-engine works, four R.A.F. stores depôts, and at the Royal Airship Works, Cardington.

From the history of the A.I.D., one was also informed that Lieut.-Col. Fulton was Chief Inspector of Aircraft from 1913 to 1915, that Brigadier-General Bagnall Wild was Director of Aeronautical Inspection from 1915 to 1921, that Air Vice-Marshal Halahan took over that post from 1921 to 1923, and that Lt.-Col. Outram has held the post from 1923 to the present time. In connection with the list of six official dinners, one found the name "J. Jarvis, Esq., 1926-31," and it is to be hoped most sincerely that Mr. Jarvis' "reign" will continue for many more years.

More than 400 people sat down to dine, and, as on previous occasions, Mr. J. J. A. Gilmore, chairman of the A.I.D., T.S.A., was in the chair. After the loyal toasts

The Sixth Annual Dinner of the A.I.D. Technical Staff Association was held at the King's Hall Rooms of the Holborn Restaurant on May 1. This year for the first time H.R.H. Group Captain The Duke of York honoured the dinner with his presence, as did also Lord Amulree, the Secretary of State for Air

had been duly honoured, H.R.H. the Duke of York proposed "The Aeronautical Inspection Directorate." His Royal Highness said that it gave him great pleasure to be among so many representatives of the A.I.D. and to notice how well the other branches of the Air Ministry were represented. He had been reading Pepys's Diary the

other day, and would venture to adapt slightly and quote a passage which seemed to him to be relevant to that party: "Visited my Lord Sandwich and there dined with a company of friends. Did hear much discourse of the troubles of the State, and had speech with a gentleman who had travelled in Wales. He told me how Snowdon was great and beautiful above all things, though very full of traps for the unwary; and how strangely certain Welshmen behave who follow no straight path, but turn hither and thither, as it were, in uncertainty. But Lord! to think how soon I forgot my troubles in good company, with feasting and music. And so to bed, after much pleasure and enjoyment." The happy spirit of the gathering, His Royal Highness said, was due, he knew, to the fact that the department worked on the most friendly terms with its fellow departments. That was something on which he warmly congratulated them.

Pointing out that most of those present knew about the origin of the work of the A.I.D., the Duke of York recalled that this would always be associated with the names of the late Sir David Henderson and its first director, Colonel Fulton. They knew how the A.I.D. inspected all aircraft equipment for the R.A.F.; how it supervised all British civil aircraft, and so on. It worked in the closest possible touch with the aircraft industry, and representatives of the Directorate were stationed along most of the principal British air routes, where they were responsible for the safety of all British aircraft passing their stations. Proof that this fine service was appreciated might be found in the high tribute paid by Mr. Montague (whom he was glad to see there that evening) in his speech on the Air Estimates, the gist of his remarks being contained in the sentence: "I have personally seen the A.I.D. system at work and I can speak for its efficiency."

Continuing, the Duke of York said he was inclined to wonder whether the country as a whole realised the enormous burden which the Directorate of Aeronautical Inspection carried on its shoulders. The work of the aircraft inspector involved great and heavy responsibilities. He held in his hands the lives of pilot and passengers. At any time it might be his duty to take a stand which clashed with the interests of others, and, if an element of doubt existed in his mind, he had to guard against the danger of allowing outside circumstances to influence his decision. It was only right that this should be understood, and that these men, who had to carry out such important duties, should be fully recognised in every way.

The toast was replied to by Lt.-Col. Outram, Director of Aeronautical Inspection. Col. Outram recalled that this was the eighth occasion on which he had had the honour of replying to the toast of the A.I.D. He found this occasion one of the most difficult because of all the kind things His Royal Highness had been good enough to say about the directorate.

Lt.-Col. Outram then emphasised the fact that responsibility for the inspection of aircraft was not carried solely by the 547 men and women who formed the staff of the A.I.D., but was shared to a large extent by the inspectors employed by the firms, and to whom was delegated a considerable proportion of the work. These allies of the A.I.D., men who were whole time inspectors, and who, although they were employed and paid by the various firms, were working under constant A.I.D. supervision, numbered in all many times the total A.I.D. strength. Were it not for their effective and efficient co-operation, aircraft inspection on an economical basis would be impossible. For instance, in Sheffield alone the firms' inspection staffs nearly equalled the A.I.D. staff.

There were two points, Col. Outram said, to which he would particularly like to refer. The first was that they had with them that evening Mr. Scott, of Lloyd's Register, and Mr. Thomas, of the British Corporation Register, whose presence marked yet another step forward in their policy of enlisting the aid of commercial inspection organisations. For some time they had been delegating a certain proportion of the work of inspection to these two organisations, and they were hoping to extend that delegation in the near future. Already he was confident that this would prove just as successful as has been their earlier policy of delegating a proportion of the inspection of aircraft during construction. He thought it was a very clear indication of the growing importance of civil aviation that two old-established and world-famous organisations such as Lloyd's and the British Corporation should have considered it worth their while to extend their activities from the sea to their

The second point to which he would refer, Col. Outram said, was a suggestion made to him a few days previously in Sheffield. Certain chief inspectors of firms in that neighbourhood to whom inspection duties had been delegated, and who in that sense might be said to have been "appointed" by the A.I.D., had expressed a wish that some annual function could be arranged in Sheffield, at which they and the A.I.D. staff with whom they worked could meet once a year off duty and outside business hours. He welcomed the suggestion, which emphasised the extent to which firms' own inspection staffs now identified themselves with the A.I.D. and regarded themselves as an integral part of that organisation. What success the A.I.D. had been able to achieve had been largely due to the creation and maintenance of that point of view. He pointed out that during the 12 months since the last dinner there had been no case of failure due to the human element as regards inspection for which the A.I.D. was responsible. There was one particular case which occurred a few days ago, in which it seemed just possible, although not yet certain, that a defect should have been detected by a ground engineer.

While on the subject of further functions, Lieut.-Colonel Outram said he wanted to take the opportunity of extending a cordial invitation to visit the A.I.D. test house at Kidbrooke. There was a time when they were a little ashamed to show that establishment to those whose test reports were checked by the Kidbrooke staff, but the work of re-arranging and re-equipping the test house had been proceeding during the last two years, and he thought many of those present might like to go down and see the improvements made. Special arrangements had been made to show visitors around the test house during the afternoon of Tuesday, June 23. In order to keep the party down to a reasonable size the number of invitations must be limited, and would be issued and distributed through the A.I.D. inspectors at the various offices and works.

Referring to the work of the A.I.D. overseas, Colonel Outram said he wanted to emphasise that this overseas work was only a temporary expedient. In

various parts of the Empire they were doing what they could to help to lay the foundations of aeronautical inspection, but as the Empire air routes developed it seemed to him inevitable that the time would come when overseas editions of the A.I.D. would be formed, and that then they must retire and, while still holding out the hand of friendship and co-operation, leave them to carry on the good work.

After a brief interval, Mr. J. J. A. Gilmore proposed the toast of "The Visitors." Mr. Gilmore said that this toast was always regarded as a most important one. He expressed their great pleasure and gratitude that His Royal Highness the Duke of York was with them that evening as their principal guest. Being aware of the many engagements of the Duke of York, he thought it was something in which every member of the A.I.D. Technical Staff Association would feel a special pride, that he should have done them that honour. They all knew the great interest which His Royal Highness took in the affairs of industry, an interest which he had so much at heart that he was prepared to travel many miles and spend many uncomfortable hours in furthering the industrial welfare of the nation. For all he (Mr. Gilmore) knew, His Royal Highness was spending such an hour then.

Mr. Gilmore said we were supposed to be passing through a period of grave industrial depression, but if they looked at the very exact statistics of exports, prepared by another branch of the Institution of Professional Civil Servants, they would find one bright spot, *i.e.*, the export trade in aircraft. That bright spot, all of them, Air Ministry officials and visitors, had to make brighter still. And what was more, they could do it.

Mr. Gilmore then pointed out that Lord Amulree was present for the first time as Secretary of State for Air. Those who knew the many and varied intricacies of the law realised that with him as Secretary of State for Air, the Air Ministry and the R.A.F. were going to get justice. They would have no objection if Lord Amulree decided to temper justice with mercy.

They were glad to welcome Air Vice-Marshal Dowding as Air Member for Supply and Research, and were encouraged to hope that he would be with them on other occasions, as they noted that his predecessor, Air Marshal Sir John Higgins, was with them that evening. Sir John had laid down the care of office for the comparative ease and quiet of directing the affairs of a great company. They would welcome Mr. J. A. Webster as Chief Establishment Officer, Colonel Sheldermine, as Director of Civil Aviation, and Group Captain Cave-Browne-Cave as Director of Technical Development. All were pleased to see, once again, Air Vice-Marshal Halahan, who, in the difficult days was their Director of Aeronautical Inspection. Mr. Gilmore regretted that Mr. C. L. Bullock, Secretary of the Air Ministry, was not present, as had been hoped. He said he had a lot of snappy things to say to him, but in his absence would have to confine himself to reading a letter from Mr. Bullock, in which Mr. Bullock said that his doctor opposed evening engagements. He had hoped to be present, and had looked forward to meeting many A.I.D. people whom he had not had an opportunity of meeting before.

Continuing, Mr. Gilmore said that a note of sadness must creep in when they stopped for a moment to remember that, on the last occasion, they had with them Sir Sefton Branker, Major Percy Bishop and Sandy Bushfield, who laid down their lives on a stormy night last autumn, in that gallant attempt to show the world what Britain knew of airships. Had they been there that night they would have been among the merriest of a merry party. They could but honour their memory and press forward, confident that the aim they had set themselves should one day be accomplished.

Turning to the members of the aircraft industry, Mr. Gilmore said that looking around, one realised how far we had travelled since the days when the formula for aircraft was "wood, wire and squeak." Practically all the great industries of the country were now, to some extent, involved in supplying the wants of modern aircraft design, and it was pleasant to see representatives of so many of those industries present that evening. "The Society of British Aircraft Constructors," Mr. Gilmore said, "is a very powerful organisation. Indeed, in their rasher moments they claim to run the Air Ministry. If they can establish the claim, then we do not mind, for we shall then have no fear of their criticism." He referred earlier to the sale of British aircraft abroad. He understood some of our foreign purchasers had a habit of asking that their purchases should be submitted to the inspection of the A.I.D. It might, of course, be that aircraft firms invited their prospective customers to make that stipulation, or it might be that they even used the point to help to clinch the deal. It might be that foreign customers were a little suspicious, but wherever the truth lay in these speculations he thought the industry would acknowledge that the A.I.D. was at least a little greater help than it was hindrance in the extension of British aircraft markets.

Mr. Gilmore said they were proud to belong to the great British Civil Service. It had been asked recently what was wrong with British Civil Service, and the reply had been given that all that was wrong with it could be summarised in the one word "opprobrium." That was not true, because another newspaper had worked out that if one deducted 2 to 5 per cent. from the salaries of civil servants, the country would be put on an unassailable financial basis. He regretted that he could not quote the Bible, like Sir H. W. W. McNally had done at previous dinners, but he would point out that there was a strong connection between the Church and the A.I.D. He recalled the story of the vicar who was called to a better living, and who, a caller was informed, was praying for guidance upstairs, while his wife was downstairs packing up. A.I.D. wives, he would point out, were always packing up. He was not sure that it could truthfully be said that their husbands were either called away to better livings or praying for guidance.

Lord Amulree, Secretary of State for Air, in responding to the toast of "The Visitors," said he joined with the chairman in congratulating them on the honour which His Royal Highness the Duke of York had conferred on the Air Ministry and the A.I.D. in consenting to be present at the dinner. This was yet another proof of the practical interest which members of the Royal Family were taking in flying and in matters connected with aviation. The Air Ministry was also very gratified at the use made of aircraft by the Prince of Wales during his recent visit to South America.

The Chairman had referred to his many duties as Secretary of State for Air, and he thought he ought to explain how his day was spent. In the

morning he got a pile of letters, most efficiently prepared for him by civil servants. He attended to that, and in the afternoon, when he returned to the office, he found another pile of documents, equally efficiently prepared by civil servants for his attention. He rather was reminded of the story of the poet who was spending a week-end in the country, and whose hostess was most anxious to please her guests. One day the poet had spent all the morning in his room, and when he came down to luncheon his hostess asked how he had been getting on. To this the poet replied that he had worked very hard that morning, and had decided to delete a comma. At dinner time, his hostess again asked the poet what were the results of his strenuous afternoon's work, and he replied that he had put the comma back.

Continuing, Lord Amulree said that at this time of trade depression, it was gratifying to find exports of British aircraft so much higher than five years ago. He thought he might be forgiven for quoting statistics, and then gave the following figures for exports of aeroplanes, engines and spare parts from Great Britain in the years 1926 to 1930:—

1926	..	..	..	807,000
1927	..	..	..	845,000
1928	..	..	..	961,000
1929	..	..	..	1,558,000
1930	..	..	..	1,428,000

Lord Amulree said that no less than 26 foreign countries were using aircraft or engines of British make. The figures of exports included exports to the Dominions and Colonies, but not the value of those sent to India. In connection with export of aircraft material Lord Amulree said he was very glad to see Mr. Fairey as representing the aircraft industry, particularly as his was one of the firms who had recently assisted in demonstrating to other nations the efficiency of British aircraft. It was important that firms should do their utmost to secure orders from abroad, and His Lordship was glad to see that special attention was now being paid to this. That the value of co-operation in foreign markets was being realised was shown at the recent exhibition in Buenos Aires. There were, however, other markets and Lord Amulree said he would like to draw the attention of the aircraft industry to the Aero Exhibition in Stockholm.

The efficiency of British aircraft, Lord Amulree said, depended on the co-operation of three or four different sets of people: the designer, the engineer, the constructor, the inspector and finally the user. The best design in the world became dangerous if faulty material or workmanship was made possible. British goods had always been famous for their high standard of quality, and the fact that British aircraft so fully maintained this high tradition was mainly due to the work of the A.I.D. over the last eighteen years. In that short period a system of inspection had been devised which left a high degree of responsibility upon the contractor, while at the same time maintaining a uniformly high standard for the industry as a whole. The standard of inspection of the British A.I.D. had become the standard for the whole world. So much so that the Air Ministry was often embarrassed by the number of foreign purchasers who wished to avail themselves of the services of the A.I.D.

Group Captain H.M. Cave-Browne-Cave, D.T.D., said that as a member of the D.T.D. he was in a position to see the work of the A.I.D. from two points of view, and he was glad to see that the work on which his Department spent so much care was so well inspected. He had recently returned to the Directorate of Technical Development, and was glad to find the good relations which existed between the D.T.D. and the A.I.D. were being extended to A.I.D. people taking all the good jobs in the D.T.D. He thought the special success of the A.I.D. lay in the fact that A.I.D. inspectors were not only efficient but were also popular. After all, he said, if there was any trouble the A.I.D. had a sporting chance of passing the blame on to him.

Mr. C. R. Fairey, President of the Royal Aeronautical Society, said he was pleased to pay a sincere tribute to the work of the A.I.D. The A.I.D. was the department which was in the closest contact with the constructors, and he thought it was significant that it was also the department held in the highest esteem. That had not always been so. For instance, he could remember in the early days of his own firm, when the A.I.D. was looked upon rather as a privileged conspiracy, and he recalled that in the case of a House magazine a picture appeared showing an A.I.D. inspector arriving at the pearly gates, but spilling all his chances of entering by rejecting his own wings. Continuing, Mr. Fairey said that today the A.I.D. was, in fact, the corner-stone of British aviation. The work of the A.I.D. had enabled British constructors to increase their export trade. The overseas buyer was not content unless the machines delivered to him carried the familiar A.I.D. stamp under the celluloid cover. The buyer was not satisfied merely with the certificate of airworthiness, but insisted on having the A.I.D. stamp. He would like to pay a tribute to the Director of Aeronautical Inspection, Colonel Outram. Colonel Outram, Mr. Fairey said, was well liked at the works because he told them in blunt words what was wrong, and they could reply in similar terms without fear of being misunderstood. He hoped he had said enough to show that the co-operation of the A.I.D. was very greatly appreciated by the British aircraft industry.

Mr. J. B. Abraham apologised for asking them to put up with a speech from him, but he was sorry to discover that there was a serious omission in the programme. He had discovered that there was no toast down for Mr. Jack Jarvis, who had so ably organised the dinner, and asked them to drink to Jack Jarvis.

Mr. Jarvis, in reply, said that if at the end of every dinner they could vote it a success, then he felt more than amply repaid for any trouble he had taken in the organisation. He wished to thank Mr. H. Chambers, Secretary of the A.I.D., T.S.A., who had given very valuable assistance.

The lighter side of the programme was provided by Miss Olive Tyson (songs), Mr. Du Calion (whose skill on a ladder ought to get him a good job as an A.I.D. inspector), Mr. Bransby Williams (whose impersonations—particularly that of Mr. Bransby Williams as Sergeant Buzz-Fuzz—showed no signs of deterioration), and Gordon Marsh and the "Marsh Mallow" Girls. The evening came to a close with the singing of "Auld Lang Syne."

Mediterranean Yacht Club.

A NEW yacht club, The Mediterranean Yacht Club, with a club house at Fedhala, has been opened for yachtsmen and flying-boat owners in Mediterranean waters. The Club will provide accommodation and facilities in most of the principal ports. Special terms have been arranged for members for the services of the Cie Gen. Transatlantique for passages and hotel accommodation; the Transatlantic Hotel will provide club accommodation at special rates in ports and places where there is no club house. Brig.-Gen. Richard Carey Jellicoe, C.M.G., D.S.O., first cousin of Earl Jellicoe, is taking an active interest in the venture.

"The Metal-Clad Airship"

ON Thursday, May 14, 1931, at 6.30 p.m., at the Royal Society of Arts, 18, John Street, Adelphi, W.C.2, Mr. Carl B. Fritsche, President of the Aircraft Development Corporation of Detroit, will lecture on the Metal-clad Airship. The airship problem in all its aspects is fully discussed in the lecture, and Mr. Fritsche covers the controversial ground of the future of airship, *inter alia*, as well as the construction, design and commercial application of the metal-clad airship. The results of ten years research on this type of airship will be presented, and a film will be shown of the actual construction of the ship and of its trial flights.

THE DEVELOPMENT OF THE LONG-RANGE FLYING BOAT

By MAJOR J. D. RENNIE, A.R.T.C., A.M.Inst.C.E., F.R.Ae.S.

[Major Rennie, who is Chief Seaplane Designer to the Blackburn Aeroplane & Motor Co., Ltd. read this paper before the Home Aircraft Depot, R.A.F., Henlow, some time ago. It is of such extraordinary general interest that we have felt that it deserves to be known as widely as possible, and we are, therefore, publishing the paper in full.—ED.]

Introduction

IT will be appreciated in a paper of this length it is only possible to treat briefly the fundamental aspects of the subject, as the detail problems involved, such as fuelling, mooring, etc., although of great importance, are too numerous to be discussed, and are beyond the scope of this paper. Also, it should be stated at the outset that the treatment of the subject refers in particular to military aircraft, although in many respects there is no strict line of demarcation between purely military and merchant flying boats. It may be advisable also to state, so far as this paper is concerned, what is meant by "long range," as the term is purely a relative one. In the future the flying boat is likely to be used extensively of a size greatly exceeding the practical and economical limit of the aeroplane, and hence it will of necessity be compelled to transport itself to its base of operations. From the geographical position of Great Britain, an all-red route to the East would be indicated, which would mean initially a two-stage flight to Malta, refuelling at Gibraltar. Fig. 1 shows the track chart of this route, with the sea miles marked on. It will be seen that a fuel capacity for 1,500 miles' range is likely to cover this requirement, and a study of a map will show this should suffice for all further extensions from Malta as may be dictated by military strategic operations, unless a further easterly route were chosen via the Red Sea in preference to the Persian Gulf. Provision for longer range would, from the military load point of view, be uneconomical, as obviously the fuel load as part of the military load should be a minimum. In other words,

any advantage to be gained in this respect is of immense value and may in many cases be a deciding factor in military superiority.

It is well known from experience that a normal or overloaded flying boat, which, once air-borne, would be a perfectly normal controllable aircraft capable of carrying out its military duties, would, under certain sea conditions, fail to take off, or, if the attempt were made, be severely damaged and probably be put out of action. In other words, the difficulties to be met are mainly concerned with the sea and not the air. These difficulties have been the subject of much thought, and have led to several suggestions as to possible design characteristics or to policy in order to overcome, or at least mitigate, this unfortunate state of affairs. Further, the design difficulties are increased, as a high aerodynamic performance, especially as regards high cruising speed and long range, generally is specified, and although not explicitly stated, the criterion, up to the present, for the "take-off" times under no wind conditions has been accepted as, and based upon, a maximum of 30 secs. and 60 secs. under normal and overload conditions respectively.

Now, broadly, there are three sea conditions in which a flying boat has either to take off or alight. Firstly, in comparatively sheltered waters with light winds; secondly, in seas moderate to rough, winds variable, light to strong; and, lastly, in a long heavy swell with slight winds. Obviously, the second and third conditions are the worst, especially the latter, which, although uncommon in this country, is fairly prevalent in various parts abroad, especially at Malta, in the early part of the year.

Bearing in mind the above, the various suggestions put forward from time to time as regards design and policy may be conveniently stated in the form of three design specifications, each of which would define uniquely the general layout to meet the same requirements. They are as follow:—

Specification A

The aircraft is to be designed to operate in inland waters or between sheltered bases. To ensure a quick and safe take-off the horse-power loading should not exceed 12 lbs./h.p., and the take-off speed 50 knots. It should be fitted with not less than three engines, and the design should be such that, with one engine out of action, straight level flight may be obtained at an altitude of not less than 2,000 ft., with the remaining engines working at 10 per cent. lower than the normal revolutions, and the rate of climb at this altitude to be no less than 100 ft./min.

Specification B

The aircraft is to be designed to operate within reasonably sheltered waters; an exceptional degree of seaworthiness, therefore, is not expected or required. Under these conditions it should be capable of taking off with the maximum possible load, subject to the following condition:—

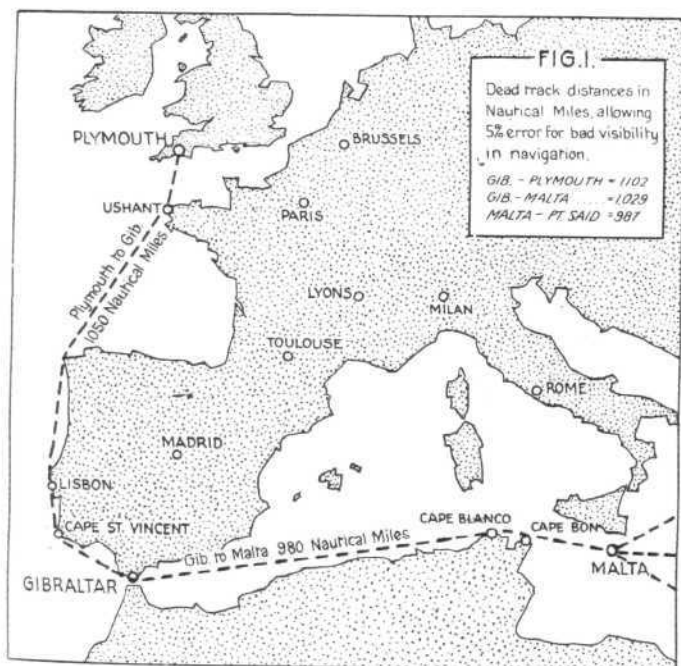
At any stage of a flight, in the event of an engine cutting out, it should be possible to jettison sufficient fuel to enable the aircraft to continue flight to the nearest base, without losing height, and the engine revolutions not exceeding the normal.

Specification C

The aircraft is to be designed with seaworthy qualities comparable with a surface ship of at least the same displacement, to enable it to operate under similar sea conditions, subject to the following condition:—

At any stage of a flight, in the event of engine failure, it should be possible to jettison sufficient fuel to enable the aircraft to continue flight, if required, to the nearest base, without losing height, and the engine revolutions not exceeding the normal.

Let us now examine briefly these specifications in the light of the military requirements outlined above. With regard to the conditions in the event of engine failure,



there is no justification for specifying flying boats with a range exceeding the requirements which may be visualised for military operations in the future, unless warranted by exceptional circumstances. In the same way, in the case of the merchant flying boat operating on long-distance routes, for the paying load to be an economic proposition there is a limit to the range beyond which it would pay to refuel at convenient stages on the route.

Design in Relation to Policy.

It is imperative that military operations should suffer the least possible interruption from either aircraft or power plant failure or adverse atmospheric and sea conditions, as

these are, of course, applicable to all three specifications, except in the case of aircraft with a larger number of engines, when either of these clauses may have to be met, with more than one engine out of action. In any case, whichever clause has to be worked to, definitely settles the gross weight of the aircraft.

A design to Specification A has one advantage in that it ensures a quick and safe take-off. It would lead to the optimum air performance and the lowest structure weight, as the worst hull and structure load are encountered taking off in rough seas. On the other hand, the low horse-power loading, consequent upon the fulfilment of the engine failure clause, would seriously affect the fuel capacity required for long range.

The majority of modern British flying boats would comply with Specification B. A moderate degree of seaworthiness has been specified, as experience has shown that only such has been obtained in practice. With the exception of the Blackburn "Iris," which have shown superior seaworthy qualities in comparison with other boats in the same class, boats to this specification are only suitable for coastal patrol or long-range overseas flights under suitable sea conditions. This means restricted utility, and, while they would not meet exacting military requirements, they are undoubtedly of great military value nevertheless.

We now come to the design to Specification C, in which seaworthiness is to be given priority. This specification would meet the requirements for a long-range overseas reconnaissance flying boat.

Apart from the military importance of being able to carry out a flight without interruption from any cause, the argument frequently brought forward in favour of the engine failure clause is that in a multi-engined flying boat, in the event of engine failure, a base may be reached safely without having to make a forced landing. Also, supposing a safe landing was accomplished under adverse sea conditions, then the possibility of being unable to take off again would not arise. Hence, continuing the argument, exceptional sea qualities are unnecessary, or the sea qualities required are impossible of attainment, therefore the probability of having to make a forced landing should be made negligibly small.

One answer to this argument, frequently expressed by the aeroplane side, is that, if shore bases are available, then multi-engined aeroplanes, owing to their lower operational cost, may just as well be used as flying boats, as the latter, according to the above arguments, would appear to lend no additional security or reliability over the aeroplane, whereas its chief asset as a type of aircraft should lie in its ability to take off and land with safety under, at least, average sea conditions.

It is generally accepted that no form of transport can be consistently 100 per cent. reliable, hence any development on the above lines would only delay progress, because, if a flying boat is to take its place as an established safe means of transport, either for military or commercial purposes, it is fundamental that the seaworthiness to be expected should be more or less comparable with a surface craft of the same displacement. There would seem to be no reason why such a flying boat, designed and constructed, of course, at some sacrifice in structure weight and at the expense of air performance, should not prove equally at least as capable of living in a sea as a corresponding surface vessel, and no less weatherbound. Progress in this direction would certainly inspire confidence in the crew and the operators, and practically eliminate the constant dread of a disaster following a forced landing at sea.

There is another aspect in this connection which may assume considerable military value in the future. The smaller naval ships, such as destroyers, etc., have reached, within narrow limits, the maximum speeds likely to be attained. Hence the next large increase in speed can only be obtained by hydroplaning, and a further increase is only possible by flight. A large flying boat, suitably armed, of comparable seaworthiness, and thus able to sit in a ditch or taxi at high speeds for lengthy periods, and take off if and when required, may be, apart from the consequent increase in the duration of patrol, of extreme utility in future military operations in other easily visualised respects.

Also, in emergency or to fulfil a specific military duty, if the engine failure clause be waived for the occasion, then the boat will take off with the greater percentage overload, as, by virtue of its seaworthiness, the time to take off becomes of secondary importance, so long as it is ultimately air-borne and able to carry out its military functions.

From the foregoing it may be agreed, if only from the military point of view, that for a flying boat of this type seaworthiness is of paramount importance, because to fulfil

the duties outlined above, it should combine as far as may be found practicable the qualities essential to an aircraft and a seagoing craft.

We will now proceed to examine the characteristics of the various types of flying boats, as it can only be by a suitable arrangement of the five indispensable main components, namely, the wings, hull, engines, water stabilisers and tail unit, that a layout is possible to meet the requirements of this specification.

The Characteristics of Flying Boat Types

It is beyond the scope of this paper to enter into a detailed discussion of the aerodynamic features, apart from the general layout, of the various types of boats. Suffice to say, and it has been proved conclusively from the results of performance tests of modern British flying boats, that the layout need not involve any sacrifice in aerodynamic efficiency. On the contrary, the air performance of a large multi-engined flying boat may be easily superior to that of a corresponding aeroplane, if equal weight is given to air performance in both cases.

In the case of the design to Specification C, and, in spite of the exacting requirements, as will be seen later, the layout is remarkably clean, although the structure weight would be greater than, and hence the air performance inferior to, a design to either Specification A or B.

Let us now consider briefly the water performance. While this covers familiar ground, it has some bearing on an argument to follow later, so is presented here for the sake of completeness.

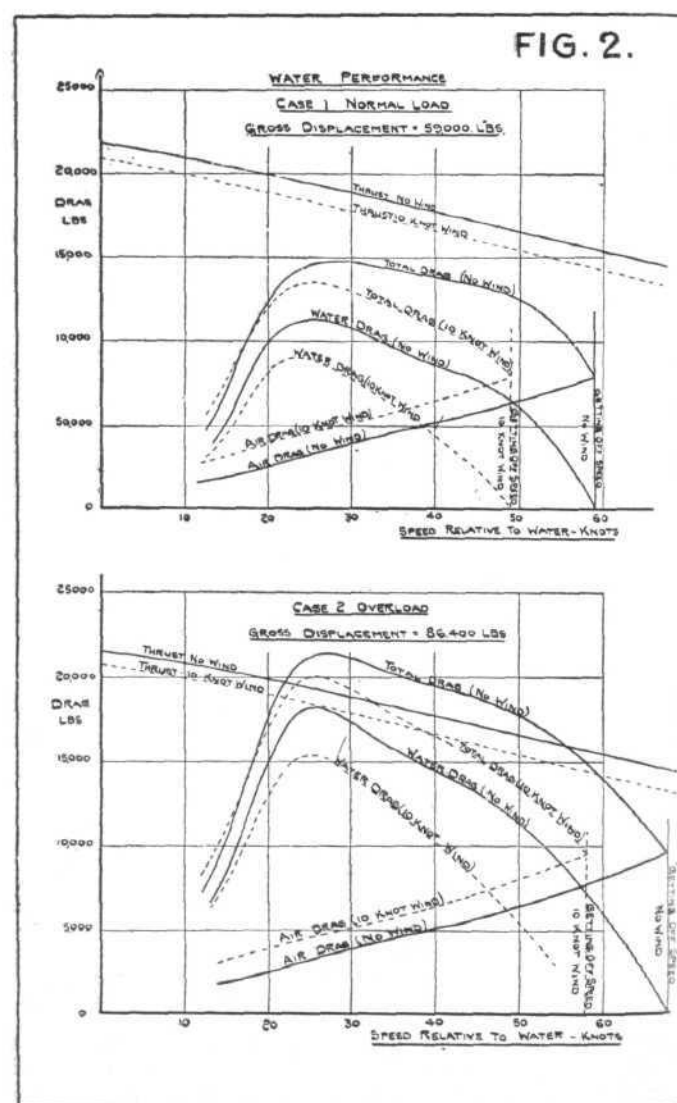


Fig. 2 shows the usual water performance chart for the normal and overload cases, in still air and in a ten-knot wind. The water resistance is obtained from tank tests and is plotted separately. To this is added the air drag, giving the total drag at all speeds up to the taking-off speed. The addition of the propeller thrust curves completes the data required. The difference between the thrust available and the total drag at a given speed, gives the force available for acceleration, and hence, by graphical

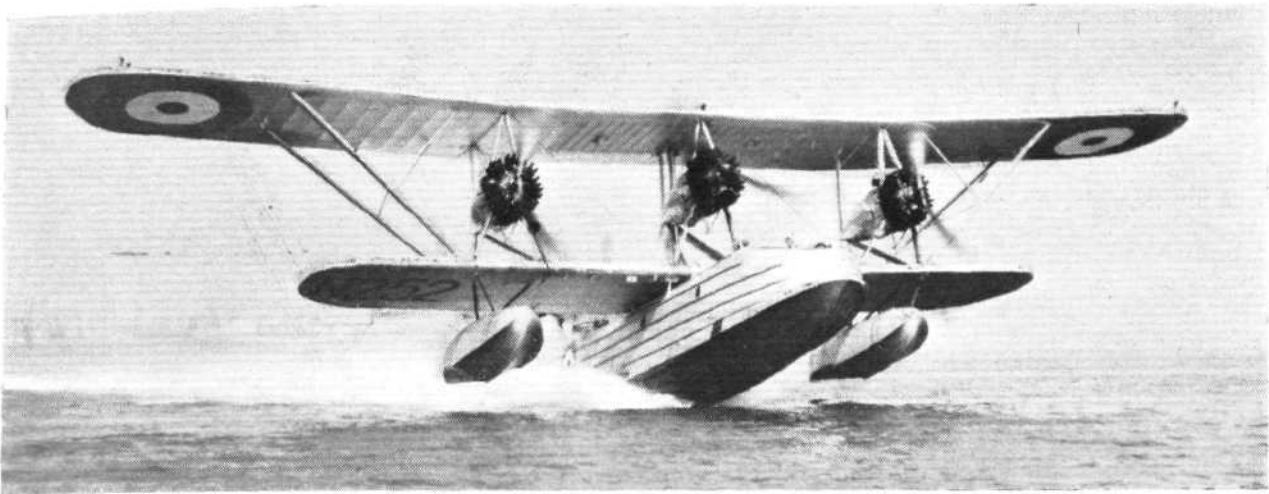


Fig. 3. A Supermarine "Southampton X" (3 Armstrong Siddeley "Jaguar") taking off.

integration, the time to take off, or, expressing this result in mathematical notation, we have:—

$$t = \frac{W}{g} \int_0^v \frac{dV}{T - (R + D)}$$

Where (W/g) is the effective mass, and as a first approximation:

- W may be taken as the gross weight,
- and T is the propeller thrust,
- R " water resistance,
- D " air drag,
- V " taking-off speed.

These curves reveal two interesting points. Firstly, the effect of even a ten-knot wind on the take-off, and, secondly, the total drag rapidly increases with speed to a maximum at between 20-25 knots, and then slowly decreases to the taking-off speed. The drag at this speed is generally referred to as the "hump" resistance, and the corresponding speed as the "hump" speed. This speed marks transition period from lift due to water displacement or buoyancy to that resulting from the dynamic water forces acting on the hull planing bottom. In other words, at this speed hydroplaning is established, and from this speed onwards the lift is rapidly transferred to the wings,

until at the taking-off speed, the weight is equal to the wing lift and the aircraft is then entirely air-borne.

Now, when at rest, and up to just over the hump speed, the weight is supported by the water buoyancy, hence static water stability conditions prevail. Owing to the relatively high position of the centre of gravity of a flying boat, and the low centre of buoyancy, the metacentric height is negative, hence the boat is unstable laterally, or, in other words, tends to heel over if disturbed by any external force. Therefore, an additional external water stabiliser of some form has to be fitted to supply the necessary righting moment. Also, owing to the rolling couple acting on the wings, due to the cross wind which may be encountered when swinging at, or turning into the wind to pick up a mooring, a further righting moment has to be provided by these stabilisers. Further, if a minimum cross-wind force of thirty knots has to be allowed for in the design, then calculations show that, with a single hull as the flotation unit, the fitting of water stabilisers will be necessary up to the largest flying boat so far contemplated.

However, when once under way, and the speed exceeds about twenty knots, the boat automatically assumes an even keel position, due to the stable system of dynamic water forces acting on the hull planing bottom, and to the aileron controls becoming more effective as the speed increases, with the result that, for higher speeds up to the



Fig. 4. A Supermarine "Air Yacht" (3 Armstrong Siddeley "Jaguar") taking off.



Fig. 5. A Blackburn "Iris" (3 Rolls-Royce "Condor") about to alight. (FLIGHT Photo.)

taking-off speed, water stabilisers are no longer necessary. We shall return to this point presently. In the meanwhile, the various forms and arrangements of stabilisers are exhibited in Figs. 3 to 6, which are representative of four modern British flying boats. It will be observed there are four quite different layouts, which are as follow:—

- Fig. 3.—The Supermarine "Southampton Mk. X." A sesquiplane fitted with inboard floats.
- Fig. 4.—The Supermarine "Air Yacht." A high-wing monoplane boat, fitted with Dornier type stubs.
- Fig. 5.—The Blackburn "Iris II." An equal-span biplane boat, fitted with wing-tip floats.
- Fig. 6.—The Blackburn "Sydney." A high-wing monoplane boat, fitted with inboard floats.

There are, therefore, three types of water stabilisers commonly in use, namely, the Dornier type stubs, the inboard floats, or the more usual wing-tip floats. All of these suffer from the grave defect of vulnerability during a take-off or landing in a heavy sea, and if sufficiently damaged, may easily lead to disaster or the total loss of the ship. It is unanimously agreed that all these types are a menace to seaworthiness. Now we have seen above that stabilisers are not required above speeds in excess of about 20-25 knots, and it is at these higher speeds that damage is most likely to be sustained. It may be remarked that stabilisers may be necessary at all speeds, in the case of an attempt to take off along a heavy swell with little wind.

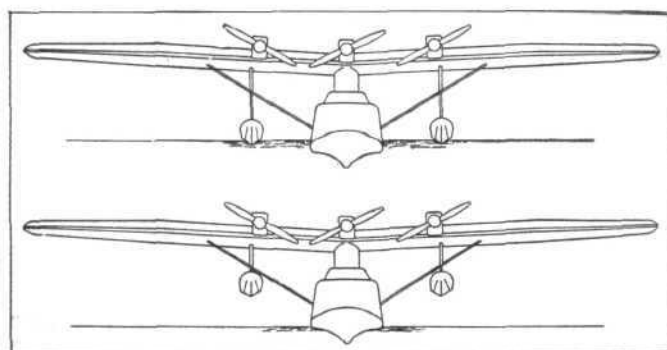


Fig. 7. Retractable Water Stabilisers.

Fig. 7 then shows an alternative arrangement, which would seem to overcome the vulnerability troubles inherent to the types of stabilisers described above, and so present a unique advance in the quest for increased seaworthiness in this respect. It will be seen that retractable inboard floats are proposed, of which the vertical height may be adjusted rapidly by the pilot to suit the sea conditions prevailing either during the take-off or landing, and, therefore, during the high-speed stage be clear of solid water and hence damage.

(To be concluded)



Fig. 6. The Blackburn "Sydney" (3 Rolls-Royce "Kestrel") monoplane Flying Boat. (FLIGHT Photo.)

THE ROYAL AIR FORCE

London Gazette, April 28, 1931.

General Duties Branch

The following are granted short service commns. as Pilot Officers on probation with effect from and with seny. of April 10:—R. K. Brougham, G. H. Davies, G. H. Denholm, J. A. Dixon, D. L. Dustin, W. N. Elwy-Jones, A. W. M. Finny, M. H. Formby, H. R. Graham, P. H. Hamley, R. H. Hobbs, S. Keane, J. H. Lingard, J. Meares, J. D. Miller, S. M. Moseley, D. H. Oxley, D. Scorgie, S. E. R. Shepard, F. W. C. Shute, L. C. Slee, A. H. J. de P. Smith, E. A. Springall, J. F. Stephens. The following Pilot Officers on probation are confirmed in rank: H. C. O'Loughlin (March 26); R. J. W. Barnett, C. F. Birks, G. A. Bolland, J. A. S. Brown, R. G. E. Catt, R. N. Clarke, L. J. Crosbie, A. E. Dobell, G. F. Keiller Donaldson, R. B. Harrison, P. Haynes, L. J. M. White (April 11).

Flying Officer G. V. Carey is granted seny. of Aug. 6, 1925; Pilot Officer L. A. Hutchings is promoted to rank of Flying Officer (Sept. 8, 1930); Pilot Officer J. A. Nicholson takes rank and precedence as if his appointment as Pilot Officer bore date March 23, 1930. Reduction takes effect from Feb. 23. The following cease to be seconded for duty with Imperial Japanese Navy (April 7):—Squadron Leader R. W. Chappell, M.C.; Flight-Lt. J. L. Wingate, Lt. T. S. Jackson, R.N., Flying Officer, R.A.F., ceases to be attached to R.A.F. on return to Navy duty (April 14); the short service commn. of Pilot Officer on probation H. O. Haughton is terminated on cessation of duty (April 29).

Stores Branch

Flight-Lt. E. S. Bullen, M.B.E., is placed on retired list (April 27); Flight-Lt. G. W. Longstaff is transferred to Reserve, Class B (April 25).

Medical Branch

A. S. Burns, M.B., Ch.B., is granted a short service commn. as Flight-Lieutenant for three years on the Active List, with effect from and with

seny. of April 14; Guy Kinneir, M.R.C.S., L.R.C.P., is granted a temp. commn. as Flight-Lieutenant with effect from and with seny. of April 7.

Dental Branch

J. E. Tyrrell, L.D.S., is granted a non-permanent commn. as Flying Officer with effect from and with seny. of April 15.

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

The following Pilot Officers on probation are confirmed in rank:—B. E. A. Pollard-Urquhart (March 19); R. C. Tripp (March 25); G. B. Shields (April 7); H. E. Reekie (April 9); J. H. Thompson (April 23). Pilot Officer on probation the Hon. H. C. H. Bathurst of the Special Reserve is confirmed in rank (Feb. 23).

The following Pilot Officers of the Special Reserve are promoted to rank of Flying Officer (April 14):—R. A. Hall, A. T. Laws.

Flight-Lt. R. E. H. Allen is transferred from Class C to Class B (April 17); Flying Officer L. F. Hooper is transferred from Class C to Class AA (ii) (April 10); Pilot Officer G. J. W. Oddie is transferred from Class BB to Class C (April 26); Flight-Lt. H. J. T. Russell relinquishes his commn. on completion of service (April 20); Flying Officer H. W. Pierce relinquishes his commn. on completion of service (April 1); Flying Officer F. F. Barrett relinquishes his commn. on account of ill-health (April 29); Pilot Officer on probation T. A. W. White resigns his commn. in Special Reserve (March 20).

AUXILIARY AIR FORCE

General Duties Branch

No. 604 (COUNTY OF MIDDLESEX) (BOMBER) SQUADRON R. A. Chisholm to be Pilot Officer (March 16).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Group Captain A. C. Winter, O.B.E., to R.A.F. Depot, Uxbridge, on transfer to Home Estab., 26.3.31.

Wing Commander T. V. Lister, to R.A.F. Depot, Uxbridge, on transfer to Home Estab., 26.3.31.

Squadron-Leaders: H. G. R. Malet, to R.A.F. Depot, Aboukir, 31.3.31. V. R. Gibbs, D.S.C., to H.Q., R.A.F., Middle East, Cairo, 10.4.31. C. T. Anderson, D.F.C., to No. 504 Sqdn., Nottingham, 20.4.31. G. G. A. Williams, to No. 22 Group H.Q., S. Farnborough, 20.4.31. R. W. Chappell, M.C., to Air Ministry (D.O.I.), 7.4.31. A. L. Fiddament, D.F.C., to H.Q., Coastal Area, 7.4.31.

Flight-Lieutenants: B. Ankers, D.S.M., to No. 31 Sqdn., Quetta, 25.3.31. J. C. Belford, to Station H.Q., Heliopolis, 29.3.31. L. W. Dickens, to No. 2 Armoured Car Company, Ramleh, 1.4.31. I. G. E. Dale to No. 14 Sqdn., Amman, 30.3.31. E. G. H. Russell-Stracey, to No. 31 Sqdn., Quetta, 25.3.31. W. V. Hyde, to R.A.F. Base, Gosport, 17.4.31. H. A. J. Wilson, O.B.E., to No. 10 Group H.Q., Lee-on-Solent, 10.4.31. R. J. M. De St. Leger, to H.Q., Inland Area, Stanmore, 20.4.31. M. B. Mackay, to Marine Aircraft Experimental Estab., Felixstowe, 20.4.31. G. D. Middleton, to School of Naval Co-operation, Lee-on-Solent, 20.4.31. A. C. B. Harrison, M.C., to R.A.F. Depot, Uxbridge, 26.3.31. H. M. Groves, to No. 3 Flying Training School, Grantham, 22.4.31. G. R. C. Spencer, F. F. Inglis, both to Royal Air Force College, Cranwell, 22.4.31.

Flying Officers: M. J. Du Cray to Armament and Gunnery School, Eastchurch, 13.4.31. J. R. Mutch, to R.A.F. Depot, Uxbridge, 26.3.31. A. C. Mitchell, H. P. F. Fagan, J. N. Jaques, E. J. Corbally, all to R.A.F. College, Cranwell, 22.4.31. J. A. Harris, J. Cox, S. S. Mackay, all to No. 2 Flying Training School, Digby, 22.4.31. G. F. P. O'Farrell, G. E. Sampson, R. J. T. Barrett, all to No. 3 Flying Training School, Grantham, 22.4.31. C. R.

Lousada, W. M. Rankin, A. D. Selway, all to No. 5 Flying Training School, Sealand, 22.4.31.

Stores Branch

Flight-Lieutenants: F. B. Ludlow, O.B.E., M.C., to R.A.F. Depot, Uxbridge, 16.3.31. W. H. Harrison, to Air Ministry (D. of E.), 27.4.31.

Flying Officer A. E. Evans, D.F.C., to Station H.Q., Manston, 24.4.31.

Accountant Branch

Squadron-Leader R. Whyte, to No. 1 Air Defence Group H.Q., 20.4.31.

Flying Officers: A. E. Fairs, M.C., to No. 208 Sqdn., Heliopolis, 1.4.31. J. P. Cave, to Station H.Q., Heliopolis, 3.4.31.

Medical Branch

Squadron-Leader R. J. Aherne, M.C., to H.Q., R.A.F., Middle East, Cairo, 19.4.31.

Flight-Lieutenant J. Hutchieson, to R.A.F. Depot, Uxbridge, 16.3.31.

Dental Branch

Flying Officer J. E. Tyrrell, to Medical Training Depot, Halton, on appointment to a non-permanent commn., 15.4.31.

Chaplains Branch

Rev'd. N. F. Porter, L.Th., B.A., to No. 1 School of Tech. Training (Apprentices), Halton, on appointment to a short service commn., 14.4.31.

NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty:—LIEUT.-COMMANDER (Flt. Lieut. R.A.F.) E. M. C. Abel-Smith, to *Victory* (May 3).

LIEUTENANTS (F/O., R.A.F.): J. P. G. Bryant, J. H. McI. Malcolm, and D. A. H. Hornell, to *Victory* (May 3); and A. A. Murray, to *Hood*.

SUB-LIEUTENANTS: J. M. Wintour, J. W. S. Corbett and P. G. O. Sydney-Turner, attached to R.A.F. (to join at R.A.F. Base, Leuchars) (May 17).

AIR MINISTRY NOTICES

AIR MINISTRY NOTICES to Airmen and to Ground Engineers are now sub-divided in the manner, which was explained in FLIGHT for April 17. In view of this rearrangement and also of the increasing size of these notices, these in the future will be published in FLIGHT in summarised form only. Readers will thereby be enabled to see readily what each notice is about and if they should desire to do so, to obtain copies of the particular notices which interest them, from the Secretary, Air Ministry, Gwydyr House, Whitehall, London, S.W.1, or from the Automobile Association, Fanum House, New Coventry Street, W.1.; the Royal Aero Club of the United Kingdom, 3, Clifford Street, W.1.; National Flying Services, Ltd., Hanworth Park, Middlesex.

NOTICES TO AIRMEN, SERIES A

No. 14 of 1931. A.—Night Flying without Navigation Lights (84095/31). B.—Target-Towing Practice Flying (89965/31). C.—Flights Across the Strait of Dover (47449/30)

This notifies that night flying by R.A.F. aircraft will take place daily until May 23, Sundays excepted, between 7 p.m. and 12.45 a.m. over a

district bounded by Guildford, Alton, Reading, Egham, and Guildford. Aircraft above 2,000 ft. altitude will not exhibit navigation lights unless other aircraft are observed in their vicinity.

R.A.F. aircraft will be engaged in target-towing practice flying during the day-time from May 4 to 25 over the country east of Biggin Hill Aerodrome.

The motor lifeboat stationed at Dover will not be in service during the next three weeks.

No. 15 of 1931. Flights to Croydon Aerodrome from Abroad

A notification that the pilot of an aircraft about to fly to Croydon Aerodrome from abroad, should before taking off furnish full details of the projected flight, to the authority of the departure aerodrome. He must also insure that night lighting installations on the route are in operation when he is not equipped with radio, and anticipates that Croydon will be reached after dark. He must also communicate with Croydon immediately after making an emergency landing.

NOTICES TO GROUND ENGINEERS

No. 29 of 1931. Avro "Avian," all types. Quick release pin securing control stick in bottom socket.

It has been found that there is a possibility of the keeper on the quick release pin securing the control stick in the bottom socket being placed in such a position that it limits the forward movement of the stick. This notice authorises the modification of the tail portion of the keeper to pin from the centre line of the pivot pin.

THE ROYAL AIR FORCE MEMORIAL FUND
The usual meeting of the Grants Sub-Committee of the fund was held at Idlesleigh House, on March 16. Mr. W. S. Field was in the chair, and the other

members of the Committee present were:—Mrs. L. M. K. Pratt Barlow, O.B.E. Air Commodore B. C. H. Drew, C.M.G. The Committee considered in all eight cases, and made grants to the amount of 96 8s. 6d.

MODELS

Pilcher Cup Competition on Wimbledon Common

ON Saturday, May 2, the Pilcher Cup was competed for at Wimbledon, having been postponed from the previous week. The winner was Mr. A. T. Willis, T.M.A.C. (10th Wing). There was a good attendance of members of both the S.M.A.E. and T.M.A.C., and a fair number of entries from both clubs for the Competition. About 3 o'clock, when the competition was due to commence, adverse weather conditions set in, and rain fell mercilessly for about an hour and a half. When the downpour had subsided, models were unpacked again, and the competition started in earnest. On account of the damp atmosphere record times could not be expected, and the result was as follows:—

1. Mr. A. T. Willis, T.M.A.C. ... 81 secs.
2. Mr. Davies, T.M.A.C. ... 68½ "
3. Master A. M. Willis, T.M.A.C. ... 62½ "

However, in spite of the bad weather, the competition was a successful one, particularly from the point of view of The Model Aircraft Club, whose members secured the first five places. There were the usual crop of casualties. Mr. Bullock broke his rubber motor, which is fatal to a balsa wood model. Mr. Cook had trouble with his propeller spinner and wing, and Mr. Souhami, in trying a new wing, broke two propellers and a spindle. These three were therefore non-starters. Many good flights were made in the competition, but, as is a common occurrence, better flights were made before and after; two worthy of mention being Willis' 2 mins. 4 secs., and Pelly-Fry's 88 secs.

The Model Aircraft Club (T.M.A.C.)

A GRAND Rally of all Wings and Squadrons will be held on Wimbledon Common (Windmill) on Saturday, June 6, at 3.30 p.m. It is hoped that Provincial Wings will be present at this gathering, when attempts will be made to improve existing records. Aero-modellists who live in the Manchester District and do not already belong to a club should get into communication with Mr. F. Wright, 429, Eccles New Road, Salford, Manchester. Members of T.A.M.C. who live in or around Reading please communicate with Mr. W. A. Smallcombe, B.Sc., Curator, Museum and Art Gallery, Reading, who is organising a Wing of the T.M.A.C. in this area. A. E. Jones, Hon. Secretary, 48, Narcissus Road, West Hampstead, N.W.6.

The Aircraft Club, Harrogate, Model Section

THE Model Aeroplane Competition, which was originally arranged for Saturday, May 2, has been postponed until Saturday, May 16. All entries should be in three days before the competition, and entrants should have their models ready for flying on the field by 2.30 p.m. The exact location of the flying ground and any further particulars will be posted at Messrs. Glovers' Motor Show Room in Station Parade, Harrogate, on the day of the competition.

Entries should be sent to Mr. C. H. V. Ellis, 12, Belmont Road, Harrogate.

Bournemouth Model Aircraft Society

The following Competition fixtures have been arranged by the Bournemouth Model Aircraft Society:—

May 9.—W. E. Evans Propeller Competition (Duration and Reliability).

July 4.—Farrow Shield Inter-Club Contest.

July 18.—G. F. Baster Challenge Cup (Duration Contest).

August 3.—S.M.A.E. Medal Competition (Span Models).

August 15.—"Anonymous" Junior Challenge Cup (Duration Contest, any type).

August 29.—H. V. Church Speed Challenge Cup (Speed Contest).

September 26.—B.M.A.S. Cup (Duration and Reliability).

Time and Space.

A DUTCH film group is now preparing a modern sound film with the above heading. Many of the scenes will receive the assistance of Imperial Airways Ltd. and the K.L.M. Line as well as various other European air lines. Air traffic will in general be the main feature of this film, and will form the background for the production of a modern character sketch.

Up-to-Date Publicity.

THE Cirrus Hermes Engineering Co. have just produced two very attractive leaflets giving all the essential details of their engines, one written in both English and French

fully describes the 110/118 h.p. Cirrus Hermes II and the 105/115 h.p. Inverted Cirrus Hermes IIB, and another version written in Spanish has been widely distributed at the Buenos Aires Exhibition. Anyone who is interested in these engines should apply to the Cirrus Hermes Engineering Co., Croydon Aerodrome, Surrey, and mention FLIGHT, when a copy will be gladly sent them. We need hardly eulogise them here since in the hands of so many pilots they have achieved world-wide renown, and the Cirrus has justifiably been called the engine which made the light aircraft possible.

Aero Hire Activities

WE are informed that Aero Hire, Ltd., late of Castle Bromwich Aerodrome, Birmingham, are recommencing their usual flying activities, such as short flights, tuition, aerotaxis, aerophotos, etc., at Dunstable Downs, one mile of Dunstable Cross Roads.

PUBLICATIONS RECEIVED

Technical Notes: No. 350. *Methods for the Identification of Aircraft Tubing of Plain Carbon Steel and Chromium-Molybdenum Steel.* By H. W. Mutchler and R. W. Buzzard. No. 359. *A Balanced Diaphragm Type of Maximum Cylinder Pressure Indicator.* By J. A. Spanogle and J. H. Collins, Jr., No. 360. *The Pressure Distribution over a Square Wing Tip on a Biplane in Flight.* By R. V. Rhode and E. E. Lundquist. No. 361. *The Effect of Small Variations in Profile of Airfoils.* By K. E. Ward. No. 362. *Lift and Drag Characteristics of a Cabin Monoplane Determined in Flight.* By F. L. Thompson and P. H. Keister. No. 363. *The Behaviour of Conventional Airplanes in Situations Thought to Lead to Most Crashes.* By F. E. Weick. No. 364. *Tests in the Variable-Density Wind Tunnel to Investigate the Effects of Scale and Turbulence on Airfoil Characteristics.* By J. Stack. No. 365. *Interference Effects and Drag of Struts on a Monoplane Wing.* By K. E. Ward. U.S. National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

The "Ashanco" Patent System of Ventilation for Moving Vehicles. Geo. Johnston, Ltd., 173, 175, 177, Shaftesbury Avenue, London, W.C.2.

The Aircraft Year Book for 1931. Compiled, written and edited by Aeronautical Chamber of Commerce of America, Inc. New York: D. Van Nostrand Company, Inc.

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AERONAUTICAL PATENT SPECIFICATIONS

(Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

APPLIED FOR IN 1930.

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- 1,567. SPERRY GYROSCOPE CO., LTD. and A. L. RAWLINGS. Gyroscopic compasses. (346,466.)
 1,968. ECLIPSE AVIATION CORPORATION. Engine starting-apparatus. (346,475.)
 8,396. J. BARROS. Stall-warning device. (346,496.)
 3,878. J. E. ELLOR. Means for regulating i.c. engines for aircraft. (346,503.)
 21,435. KNORR-BREMSE AKT.-GES. and K. KOLLINER. Pressure, medium brakes and steering-devices for aircraft. (346,630.)

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